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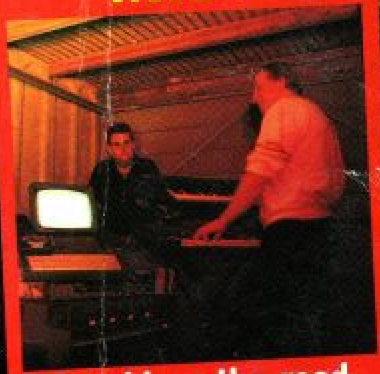
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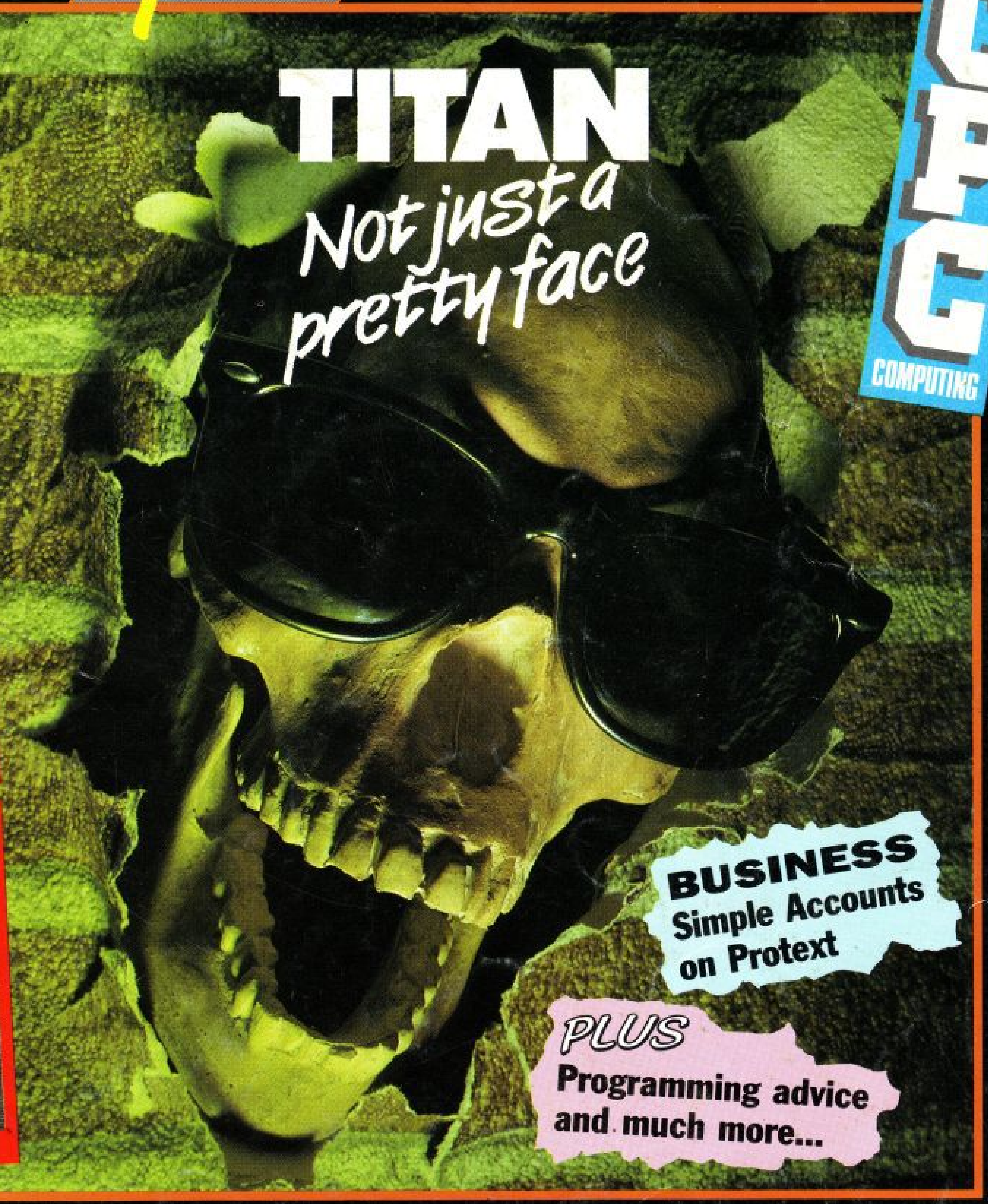


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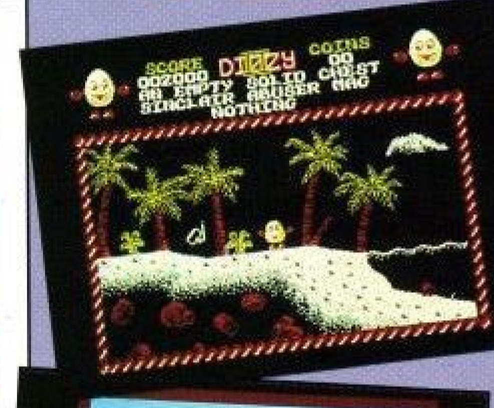
The official magazine for
Amstrad CPC users

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February 1989

REGULARS

WHICH GAME?





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NEWS Computer User

Spray it again, Sam

FED up with fabric printer ribbons drying up on you? Poole-based Caspell Computer Services is. In fact, the company is so fed up that it is launching a new product to end the problem.

"Refresh is a complex mixture of inks, oils and paraffin," Caspell told *ACU*. "To re-ink a ribbon you lift off the top of the cartridge, spray in some Refresh and replace the cartridge lid.

"It also lubricates the print head as the ribbon is used, resulting in quieter printing and enhanced print head life".

It is expected that one can of Refresh, costing £8.95, will give 25 to 30 re-inkings – that's just 30p a spray. Further details from Caspell Computer Services on 0202 666155.

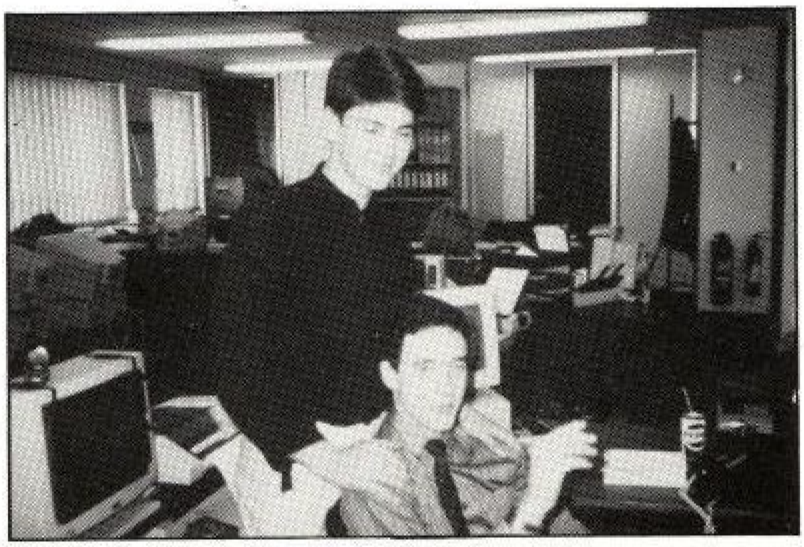
Top of the profits

AMSTRAD employees are the hardest working in the industry *(except for Robert Goode. Ed)*. This is according to the Datastream division of Dunn and Bradstreet, which specialises in supplying the Stock Market with statistics.

The results were published in Computer Weekly, the trade magazine read by programmers and data processing managers in the world of mini and mainframe computers.

Datastream found that of the 85 information technology companies listed on the Stock Market, Amstrad had the best turnover and profits per member of staff with the 11th largest turnover, and was the ninth largest company in terms of what the shares are worth.

Part of the reason for these impressive figures is the low level of salaries paid at Kings Road. Alan Sugar earns a mere £105,000, which is peanuts compared to his best customer, Dixons boss Stanley Kalms, who takes home five times as much. The Amstrad chairman is 22nd in the list of top earners



Life at Amstrad is one long party, as Robert Goode (seated) and colleague demonstrate

surveyed by Datastream.

Alan Sugar does have a share dividend in addition to his salary to swell his bank balance. Despite having the lowest share yield in the industry (0.5 per cent) with a 0.7p per share dividend, he takes home more than £150,000 extra per year.

With all this efficiency you would have thought that the Amstrad plc Christmas party would be something special. Well, it would have been had the company not booked both the Queen Elizabeth Hall in Westminster and the Hilton Hotel in Park Lane.

The Hilton was cancelled because of a price dispute, after which the Queen Elizabeth Hall turned Amstrad down because the powers that be couldn't decide what they wanted.

The party was eventually held in the office. Amstrad technical support person Robert Goode told *ACU*: "I didn't notice the difference... hic."



David Darling (left) and Bruce Everiss, determined to keep Code Masters at the top

Keeping in step

CODE Masters Software is to increase the cost of its budget range to £2.99. The new price represents a 50 per cent increase, although it will bring the Warwickshire-based company in line with rival budget labels like Kixx and Rack-it.

"The big difference between Code Masters and the others", said Bruce Everiss, "is that *all* our software is new and original. For this reason, we can't afford to continue at £1.99".

Reaction to this news has been varied.

Alex Aird, boss of Birmingham software retailer The Computer Store, said: "This increase will definitely affect our sales of Code Masters software. The only cassettes we can sell at £2.99 are re-releases of popular full price games like Gauntlet".

But with the £9.99 release of Four Soccer Simulators on Code Masters Gold, which rocketed straight to number two in the Boots Top 10, Code Masters re-gained the Gallup Chartalk number one software house crown.

Managing director David Darling is determined to keep his company at the top, so much so that Code Masters has issued a writ against Alternative Software for breach of copyright and passing off.

The writ concerns Alternative's Formula Grand Prix, the packaging of which Code Masters alleges plagiarises that of its Grand Prix Simulator.

"Our original ideas in product packaging and marketing have been widely imitated", said David Darling. "This has now reached the point where we have no option but to protect the intellectual property which is responsible for our success".

WHICH GAME?

Jeff Walker brings you the latest news on the games software scene

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CODE Masters has gone CPC crazy. That's the conclusion we've come to after speaking to Bruce Everiss this month about the company's forthcoming release.

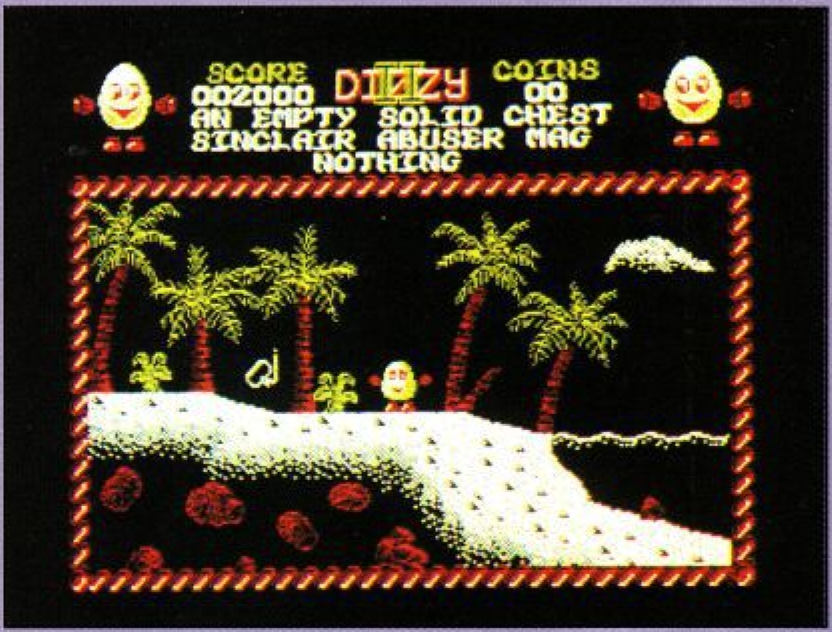
"We feel we've been neglecting the CPC scene of late", said Bruce, "but we are about to put that right".

No less than 11 games will be released this month. The list includes titles like the Oliver Twins sequel to Dizzy, *Treasure Island Dizzy* and the game that BMX freaks have been waiting two years for, *BMX Freestyle*.

Conversions of the CBM 64 smash hits *Professional Skateboard Simulator* and *International Rugby Simulator* are bound to be popular with CPC games players, along with *Ninja Massacre, Twin Turbo V8* and *BMX Simulator II*.

First off the Code Masters £2.99 assembly line will be *Death Stalker*. We've been promised a review copy for next month.

QUESTION: When is Ikari Warriors not Ikari Warriors? ANSWER: When it's *Victory Road*, the new release on the Imagine Software label, in which you must fight your way across a "fantasy Arabian-style land" in the role of a "Ramboesque" warrior. Sounds silly to us, but Colin says he quite likes it. Review next month.



Treasure Island Dizzy, new from the Oliver twins on the Code Masters budget label

HOT on the heels of Lancelot comes the CPC conversion of *Ingrid's Back*. This latest Level 9 adventure picks up the story after Ingrid Bottomlow returns home to Little Moaning after taming the wilderness in Gnome Ranger.

The gnomes are back in trouble; their happy life of fishing, sitting out in the rain and and drinking gnome-brew seems doomed by Jasper Quickbuck's plans to steamroller the gnome-belt for yuppie housing. It is your quest, playing the role of accident-prone Ingrid, to save the Gnome Counties.

Ingrid's Back is a three-part adventure featuring what we at ACU consider to be Level 9's best graphics and most lifelike characters yet. Out now priced £14.95 tape, £19.95 disc. Watch out for Gandalf's verdict in these pages next month.



Ingrid and Level 9 are back. This is Doomladen – Great Aunt Halfyard's country retreat

ELECTRONIC Arts has announced the release of *Chuck Yeager's Advanced Flight Trainer*, a flight simulation featuring three levels of on-screen instruction.

The first level teaches basic flying skills like takeoffs and landings and the second goes on to advanced manoeuvres like power off stalls. By the third level you are learning acrobatic stunts and will be ready to use the formation flying feature, following Chuck's lead through a death defying obstacle course and 3D terrain.

Chuck Yeager's AFT has a release date of February and will cost £8.95 tape, £14.95 disc. Test flight next month.

French coded Mortville Manor, already a 16 bit smash, looks pretty as a picture on the CPC





BMX Freestyle from Code Masters has the same two-player option as ATV Simulator

IN July last year we told you about the CPC conversion of Palace Software's *Rimrunner*. You're probably wondering what's happened to it, and so are we.

We spoke to Palace boss, Pete Stone, who gave us the official line: "It's looking a bit gloomy", he said. "Problems with the programmer have caused us to shelve it for the time being."

On the brighter side, keep your eyes peeled for the first CPC release to come out on Palace's budget Outlaw label. "It's too early to name names", said Pete, "ask me again in the spring".

RED-hot news from France. Lankhor has converted its smash hit 16 bit adventure, Mortville Manor, to the CPC.

We've not seen the game yet, just a screen shot but from what Lankhor says – "...this software is endowed with vocal synthesis which allows the player to converse with the persons of the intrigue." – it sounds very exciting. Or should that be very confusing. We'll let you know when we see it.

GALLUP CHART

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Solar Warrior, new from Skyslip – a colourful hybrid of Salamander and Rimrunner



Chasing the crooks in Gremlin's Technocop. Out now priced £9.95 tape, £14.95 disc.

FOLLOWING the lukewarm reception of Sabian Island and Big Screen Hero, Sunderland-based Skyslip Software has released its third CPC game, Solar Warrior.

It's a space arcade adventure where you must fight to save the supplies of Earth, which have been stored on several other planets throughout the Solar System. To reach each planet you have to first fight off Salamander style aliens that surround your landing craft, which is in orbit around the plane. Then comes the tricky bit – landing on the planet's surface.

Once on solid ground you transfer into an armed buggy and it's go get 'em time as you speed round the planet in a way very reminiscent of Rimrunner. Definitely worth checking out.

We spent so long playing it that the review missed this month's copy date.

Solar Warrior is out now priced £9.95 tape, £14.95 disc. Review next month.

Want a really worthwhile gift – FOR FREE? Then cut out this voucher, and two more – one in the January and the other in the March issue of ACU. Just send them to us, and your great gift will be on its way!

AMSTRAD COMPUTER USER
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February 1989

CYBERNOID II



NIGEL

HEWSON has developed a considerable reputation for graphical excellence. Cybernoid II continues that tradition. Pity the gameplay doesn't live up to expectations. What plot there is concerns a group of interplanetary pirates who have plundered the Federation's storage depots. Shades of Blake's 7.

You have to zip round the depots and take the loot back from the pirates' spaceships using a fearsome but familiar armoury – bombs, time bombs, bounce bombs, seekers, tracers and a defence shield. The catch is that there are only a few of each weapon. In addition, you have the laser, which can fire continuously.

The aliens have a formidable fighting force – ground emplacements, flying objects and a host of other nasties. If you manage to shoot down an enemy craft its plunder survives the explosion and can be collected. If you're even luckier it will drop a canister; pick it up, and you get extra weapons.

Cybernoid II has Raffaele Cecco's instantly recognisable graphic style. The obvious disadvantage of this is that all Raff's programs look more or less the same.

Another problem is that the green screen view is rather fragmented because of several dark colours that don't show up.

Animation is excellent, with fast, smooth movement and suitably violent explosions, but control is a little awkward – in the heat of battle it is too easy to hit the wrong key and get the wrong weapon.

Behind the excellent programming lies an old and tired concept. What is the point of wasting outstanding programming talent on a poorly disguised shoot-'em-up?

HEWSON

Developer: Raffaele Cecco

Tape: £9.99

Disc: £14.99

11/20

A NEW BEGINNING

THE beliefs that split mankind into opposing camps are many and varied. Politics, religion, Association Football – all of these and more have been responsible for conflict and dispute.

One topic, however, has been responsible for more disagreement than any other. Families have been divided, lifelong friendships broken, husband set against wife, brother against sister – all by a mere board game. You either love it or loathe it.

Trivial Pursuit, for those of you who have been cut off from the rest of civilisation for the last few years, is a game that makes use of those odd snippets of information that collect like so much fluff in the belly button of your mind and emerge, only after the administration of large amounts of lubricating fluid, to amaze your companions.

If you are the sort of person who finds it immensely significant that Denmark has the highest rate of borrowing from public libraries per capita, then you are likely to become an addict. If you are not, then you will be condemned to suffer long periods of intense boredom broken only by moments of extreme anger as you are told more than you want to know about the mating habits of the Common Stickleback.

It was only a matter of time before Trivial Pursuit was developed as a computer game, complete with stunning graphics and whizzo sound effects. The original has now been superseded by the new.

So what's new? Well, instead of just sitting around answering questions, we now have a plot. The game is set far into the next century. Earth is a dying planet and you have been assigned the task of carrying civilisation to Genus 2.

The object of the game is to pilot your laser-driven rocket into space and be the first player to be accepted by the elders on Genus 2.

You will have to travel through six galaxies, each of which contains many planets. On a few of them are hidden objects, which you will need to collect in order to gain access to the next galaxy. The only way to locate these objects is to land on each planet. A native will ask you a question, and only if you answer correctly will you be allowed to continue.

When you have collected an object from each of the six galaxies you will be able to land on Genus 2. There you will be questioned by the six elders to ensure that you are genuinely trivial.

You must select which elder is to question you, although only one has the key question that will enable you to win. Sounds exciting, doesn't it?

Unfortunately, it isn't. It soon becomes obvious that this is nothing more than the original game dressed up with a fancy story. The laser spaceships and mysterious planets add nothing because you are never allowed to fly anything, search anything or even shoot anything. They just provide a way of moving from one question to another.

So is this a game worth buying? Well, you do get 3,000 questions for your money. Given the price of the standard board game, which comes with 1,000, that represents reasonable value. However, all the complications of the plot make it painfully slow to play, and even the most devoted fan is likely to find his or her enthusiasm waning rapidly.

The graphics and sound effects are mundane. The irrelevant plot, average graphics and sheer tedium of the game give a new meaning to the word trivial.

LIZ



DM

Developer: Oxford Digital Enterprises

Tape: £14.95

Disc: £19.95

6/20

ROMANTIC ROBOT *present*

1989 - THE YEAR OF THE ROBOT

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That alone would have satisfied many people, but Romantic Robot has gone one step further, incorporating a memory editor. No program is safe with this: everything is out in the open, including the Z80 registers, CRTC data and any part of memory.

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Multiface II must be the cleverest hardware device at present – a necessity for disk owners who thought they were stuck with loading from tape every time.

AMSTRAD ACTION JANUARY 1987

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GUERRILLA WAR

COLIN



YOU play the role of a crazed hairy primate intent on destruction of mankind. Armed only with explosive bananas, you must avenge the destruction of the rain forests. Unfortunately, this doesn't happen – SNK chose to spell it Guerrilla, so the insane monkeys are out, sadly.

We are still in the tropics, but rather than a holiday in the sun, it is an oppressive line in dictatorships. The masses starve while the evil general lives in the lap of luxury, eliminating all who speak out against him.

All hope has left the island (in a small rowing boat with only three days' supplies). Only a miracle will save the populace.

What is this speeding towards the shore? Could it be a small boat containing two crack marines armed to the teeth and trained to kill?

Pretty close – these guys are armed to the nose and they're gonna show that no scuzzball dictatorship is gonna make no appearance in their game lessen it's being wasted by them.

A welcoming party is lined up on the shore, Kalashnikovs to the fore, the intention being to avoid any liberation attempts. After several loud bangs the marines make their way towards the dictator's pad.

There are weapons to be had among the remains of the welcoming party; either a handy-dandy bazooka or a roasty-toasty flamethrower. Both of which are strong arguments in favour of liberation.

But soft! What lump is this that on the horizon stands? It is a tank, complete with ignition keys. You can hop into one of these and play a game of Squish the Opposition, popular in late '60s Vietnam. Running out of fuel or being grenaded can prove slightly fatal, so it is best to look where you are going.

All this stuff sounds mighty familiar if you've ever played Ikari Warriors. SNK seems to like this general plot because the company has done three variations on this same theme.

If you have to copy a plot, you will not get much better than this, but third time round it begins to pall, even if Guerrilla War does have the vast technical advance over Ikari Warriors.

Yes, we have had to wait two years to get a horizontal scroll to go with the vertical one. We are talking serious progress here.

Although Guerrilla War is Cliff Richard's fave coin-op – no kidding – Sentient Software hasn't done it any good in the conversion. OK, so we have several squillion k of memory less here, but everything goes at roughly the same rate as an arthritic flatworm. It also flickers while it is about it, and uses a desperately slow multi-loader system.

The graphics are crude. The sound is adequate – the tune is quite good – but sound cannot make a game.

MELBOURNE HOUSE

Developer: Sentient Software.

Tape: £9.95

Disc: £14.95

13/20

Terrorpods

LIZ



THERE has been a long line of "zap the disgusting aliens where it hurts" games. But despite the varied and complex plots, the action tends to differ little.

No doubt it is difficult for games developers to come up with enough variations on this well worn theme to ensure their creations are playable, memorable and capable of holding the attention for more than five minutes.

Two common approaches are used to overcome this problem. The "blind 'em with science" technique consists of stuffing the game with a bewildering array of hi-tech special effects and weaponry which require the dexterity of Paul Daniels to operate – "the mega-neutron- disintegrator-meson-pulse-bomb is engaged by simultaneously pressing the Control and Escape keys while waggling the joystick with your toes."

The alternative is to ensure that the game looks good and maintains a balance between being too difficult for the majority of casual users while not being over simplified to the extent that boredom sets in rapidly.

Terrorpods is a hitech shoot 'em up that has adopted the latter approach, and is all the better for it.

True, the plot runs along familiar lines – awesome Terrorpods are making life difficult for a colony, destroy all the Terrorpods in the colony's six sectors, collect a full set of Terrorpod components and deliver them to the Federation – but the gadgets and gizmos are kept to a minimum.

It is a visually attractive game. Two views are available – a control panel with a display of the view forward, and a plan view of the surrounding terrain.

Two weapon systems are available, missiles and a ground-to-air laser. As you move through a sector destroying the Terrorpods and their manufacturing units, you will come under attack from the Mother Ship.

A careful eye must be kept on the meters; run out of fuel and you can't move, run out of detonite and your weapon systems become inoperative.

Switching to plan view enables the Terrorpods to be located easily, however movement while in this mode tends to use up fuel at an alarming rate.

Control of your craft and of the weapons has been made difficult enough to ensure that it is not just a matter of point and fire. A good deal of concentration is needed.

This game breaks no new ground, and contains no startling innovations. It is, however, well crafted and enjoyable to play.

Imagine ...the name of the game

Developer: Icon Design.

Tape: £9.99

Disc: £14.99

15/20

Gandalf



THE LOST LEGACY OF XIM

THE Lost Legacy of Xim features a private eye – Rick Shaw – who has been commissioned to find a priceless stolen relic. Although there were ancient records of a jewel-encrusted eagle statuette from the time of the tyrannical dictator Xim, it had disappeared from sight for many hundreds of years.

In 1964 it was discovered in Mexico by a group of Canadian researchers. More recently, Sir Robert Harker, a collector of ancient artifacts, had acquired this magnificent piece at an auction. With all the resulting coverage in the national press, it was not surprising that there was an attempt to steal the eagle. It was successful.

It is believed that the crooks have their base in a small coastal town and Sir Robert puts his private plane at your disposal. Once aboard, you learn to your cost that the pilot also has a criminal interest in the eagle.

The game starts with you bound hand and foot lying on the floor of the plane. This could be a little frustrating, as Xim's parser is slightly unconventional at times. In this instance it needs an input of *examine self* to learn about your present predicament.

You must now find a way to cut through your bonds. You have only a limited time to escape from the plane before it crashes, because the pilot has killed the co-pilot and baled out.

Time passes for every move you make. If you give no commands, time passes anyway. There is no *pause* command, but any keyboard entry without pressing Return or Enter will stop the clock while you think what to do next.

The long and colourful location descriptions must be read carefully because it is not always obvious what might or might not be useful to you.

Xim is not an easy game to play, partially because you will have to first find out what input commands it will understand. It also gives the impression of being made difficult for difficulty's sake, rather than posing purely logical problems. The puzzles *are* logical, but do stretch your belief at times.

There are a couple of places where time is important. There is also a very strong likelihood of you dying from thirst or hunger before you can find food or drink. It is almost certain that you will have to start from the beginning once you know the order in which you must proceed.

The Lost Legacy of Xim is not one of the friendliest adventures, and may well have you cursing under your breath. Win through to the end, however, and you will be very satisfied – even if it is only at the relief that it is all over.

LEISURETEC

Developer:
Caris Software.
Tape: £9.95
Disc: £14.95

12/20

MOTORBIKE MADNESS

WHOEVER wrote this game (one of the Binary Design bods) knows at least one thing about motorbike trials – the fact that if you do a touch of stunting, the bike is going to suffer at least as much as you are.

When the bike suffers, something else suffers – your bank balance, because trials bikes don't grow on trees. Isaac Newton wouldn't have known what hit him if he had sat beneath a Kawasaki tree instead of an apple tree.

The idea behind trials is to show your complete mastery of bike handling. The course is timed, but that is really of secondary importance, because only skill will determine whether you complete the course.

After a minimal flurry of preamble you start of at the top of a hill. The idea is to get to the bottom without falling off. Glider Rider and Amaurote players will immediately feel at home, because some of the graphics have been lifted from both games.

The controls, although logical, are a bit weird, and take a lot of getting used to. The isometric graphics system makes lining up with the various obstacles rather difficult.

The simplest of all the obstacles is the ramp jump, which only requires approach at the right speed and angle to clear it. Steps and planks need hair-trigger accuracy with both line and speed to have any chance of a healthy points bonus, which will eventually turn into dosh to facilitate repair of your steed.

If things get really bad you can even buy a whole new bike. But you can't buy it on credit – nobody trusts bikers.

Rough ground is the real killer. Go too fast and it's definitely Goodnight Vienna. The trouble is, you have to go dead slow over this stuff – so slow that you have only a very slim chance of completing the course.

A neat little picture of a bike slowly falls to bits as you wreck your own. A pretty trick, but why does it have to fill one third of the screen?



COLIN

Motorbike Madness is nicely presented, with pin-sharp four-colour graphics. The sound is adequate, the scrolling is without a flicker.

All would be right with the world was it not for the fact that the game is impossibly hard. You touch anything at slightly the wrong angle and it's bend the bike time.

At least you can take heart from the fact that the Spectrum version on the flipside is just as difficult.

MASTERTRONIC

Developer:
Binary Design.
Tape: £1.99

14/20

SIREN SOFTWARE

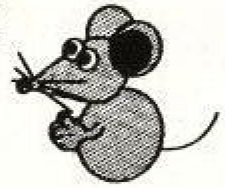
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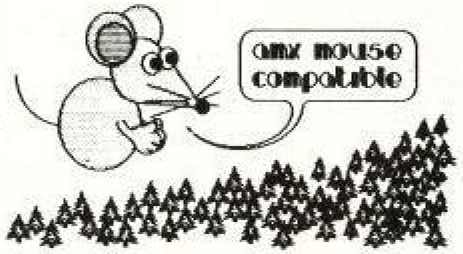
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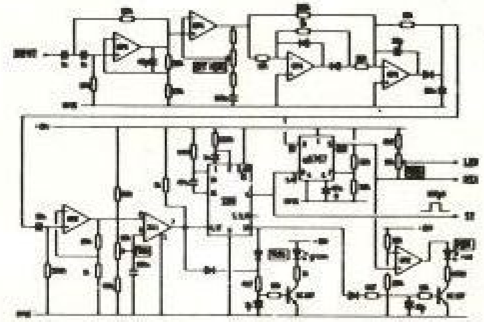
FILING PAGE: DISC OPERATIONS INCLUDE ...
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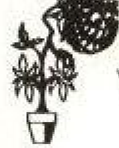


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Video Classics

EVERY so often a game comes along that is original, well executed and fun to play. Video Classics isn't that game. After about 15 seconds loading time – and that's from tape – the game bursts on to the screen. You are presented with a menu with the options to play tennis, football, solo or normal squash, Four Bat Blip or Astrobliperoids – all against the computer or another person.

Yes, Video Classics is based on the very early computer TV games – the ones that were usually made by Binatone in horrible orange plastic boxes with knobs.

After much messing about with the aerial cable, a picture of two oblongs (the bats) and a small square (the ball) appeared on the screen. Then father stole the controls and played with it himself all night.

Tennis, football and squash are self explanatory. Four bat blip is just tennis with two bats along the top as well as down the sides. Innovative, eh? Astrobliperoids is the nearest thing in the game to originality. Imagine tennis with four blobs wandering up and down the screen getting in the way. That is Astrobliperoids.

In several of the games the ball will travel quite happily through a bat. While playing squash it is impossible to tell your bat and the computer's bat apart, which, to say the least, makes play difficult. In solo squash you actually get 10 points every time you *miss* the ball. I racked up rather a good score on this one.

If Video Classics was debugged and some extra sound added it might make an enjoyable history lesson for those who missed out on the birth of the TV game. For those who buy games to play and enjoy – forget it, I've seen better games on pocket calculators.



SILVERBIRD

Developer: We won't embarrass him.
Tape: £1.99

1/20



THUNDERBLADE

AFTER last year's fiasco with Out Run, when US Gold made a mint out of a naff game, I was prepared for the worst when I popped in the disc labelled Thunder Blade.

My suspicions were highlighted by having spent a small fortune shovelling shekels into the arcade version, which uses two 68010 processors and more homebrew chippery than McDonalds has ever seen.

I was amazed. The Tiertex conversion is stupendous. To be able to zoom in on the ground by climbing and diving is something very special. Japanese companies have spent billions of yen designing chips to do the job, and the Frenchmen from Tiertex have done it in software on the CPC.

To zoom in needs multiplication routines, something computers are quite slow at. As a result the CPC chugs a little. The maths gets heavier and the programming more impressive when the view changes to an over-the-shoulder shot. Tower blocks loom larger and larger as the action hots up.

A dedicated team of programmers spending months toiling over an assembler always has to be complemented by someone spending 15 minutes thinking up a plot. According to the blurb, your country is being overrun by rebel forces led by a General Swindells.

The government is in danger of being overthrown and USGHQ have called upon you and the Thunder Blade helicopter – the ultimate flying machine – to defeat the enemy, taking on land, sea and air forces.

The battle is not quite single-handed as, you have five lives and incredible firepower – a rapid fire chain cannon and an inexhaustible supply of missiles.

The flight controls are, erm, interesting. Waggling the joystick left or right banks the helicopter. Pushing forward causes the chopper to dive, pulling back makes it rise. If you hold down Fire, forward accelerates, while yanking the stick back makes Thunder Blade slow. Fire also has to double as the trigger to unleash kilotonnes of machine gun and missile fire.

The result of the extensive use of the Fire button is that to move you have to shoot. While you are diving you cannot shoot, but this is a better compromise than using extra keyboard controls.

Master the controls and you can take on the greeblies. To start with they take the form of tanks, which have a penchant for taking you out of the sky. The odd AH-Sparrow attack helicopter comes for you, and there's an F14 stolen from AfterBurner.

Later levels have you doing battle at sea – the movement of the ship being used as an effective excuse for slow scrolling. Later still you fly into a canyon where there is no excuse for the exceptionally slow scrolling – no excuse other than Thunder Blade's attempt to squeeze more out of a Z80 than it can hope to deliver.

Throughout the game you have a choice between flying low to score lots of points, or flying high where it is easy to dodge enemy flak but not much chance of fighting back. This makes the early screens seem easy and a little dull. . . unless you go in low with carbines blazing.

The play area has been shrunk to about a quarter of the screen size, and still the game slows down. When you are in the thick of things the small screen does not seem to matter, but the sloth does.

Thunder Blade is an impressive programming achievement. It is also a very good game. But it proves that by trying too hard you can lose playability.

STAR ACU GAME

U.S. GOLD
All American Software

Developer: Tiertex.
Tape: £9.99
Disc: £14.99

17/20

Return of the Jedi

SOME four years after the film was released, the computer game finally arrives on the scene, indicating perhaps that even when the force is with you some things take time.

Thoughtfully a brief synopsis of the plot has been provided for those who don't know their Ewoks from their elbows. The games joins the story when the rebels are about to launch their attack on the evil Empire's Death Star Mk2.



Leia and Luke race through the forests of Endor dispatching stormtroopers while on the way to the Ewoks' village.

Meanwhile Chewbacca, not far away in a captured Scout Walker, makes his way to a bunker to destroy the protective shield which surrounds the Death Star. Then Lando must pilot the Millenium Falcon down a convenient tube to the heart of the Death Star and destroy its central reactor.

In the first part of the game you play the role of Princess Leia, riding a speeder bike on your way to the Ewok village. You must do battle with stormtroopers – also on speeder bikes – and avoid the trees as you scroll Zaxxon-style through the scenery.

The stormtroopers are not terribly good drivers, but can get very persistent when behind you. Fortunately the partisan Ewoks have set up a few traps for these hard-to-shift imperialists.

The bikes look like excited vacuum cleaners, and you wouldn't know Leia from Chewbacca, but the backgrounds are all right – there is very good use of logical colours as the bikes flit between the trees.

Next you become Chewbacca in control of a Scout Walker plodding slowly and not a bit surely towards an imperial bunker. Curiously the imperial forces decide to combat this threat, not with pulse lasers, but with logs and stones. Nevertheless these are quite effective.

Finally you become Lando Calrissian, piloting the Millenium Falcon down the infamous tube to the Death Star reactor. Tie fighters tail the ship, but these are easily dealt with, the only other danger being crashing into the odd pillar. Although the background in this stage is very nice, it is not much more than a poor copy of Zaxxon.

Return of the Jedi is quite addictive, certainly better than the last offering in the Star Wars series. The graphics aren't bad and the scrolling is excellent for the Amstrad.

The tune played throughout the game is quite good, but the effects are the usual bang and crash affairs. The force could have been stronger.

Developer: Consult Computer Systems.
Tape: £9.95
Disc: £14.95

14/20

Four Soccer Simulators

FOUR Soccer Simulators has (ahem) four parts, one on each side of two cassettes. Three are soccer variants, the other is in the style of Hypersports. In each case, up to four players can play simultaneously, although the keyboard might get a little crowded. With the one and two player options, you can challenge the computer.

11-a-side Soccer is the full version, with throw-ins, goal kicks, corners, penalties, free kicks and all the standard rules. Indoor Soccer is the faster 5-a-side version, with the playing area walled in so the ball can't go out of play.

Free kicks are given for time-wasting and running into the opposition's goal area, as well as the usual dirty deeds.

Street Soccer is played on a giant "pitch" with cars, trees, fences, potholes, pavements and other obstacles which deflect the ball or trap it, bringing the game to a premature end. Fash would enjoy this one – you can kick your opponents with reckless abandon.

Soccer Skills divides into two parts. The first allows you to practice penalty taking and saving, plus improving your ball control by dribbling around cones.

The second part is rather out of context; it consists of sit-ups, dumbbell lifting, press-ups and other "waggle the joystick until it breaks" pursuits.

The scoring system is novel. In the soccer games, you get 100 points for each goal plus one point for every second you have possession of the ball. Each game lasts three minutes, but this can be changed. In the Soccer Skills section you have to do a certain number of exercises in a limited time.



The pitch is viewed from a rather odd perspective, almost directly above. The player you can move is either selected by the computer, denoted by a number above his head, or you can select manually.

Presentation is immaculate – a gigantic, colourful box with a free poster showing Gullit and Co., good loading screens and menus everywhere, with only two keys needed to make a choice.

The graphics are reasonably good – a little colourless, but there is no problem on a green screen. There are a host of tunes, including fanfares after every goal.

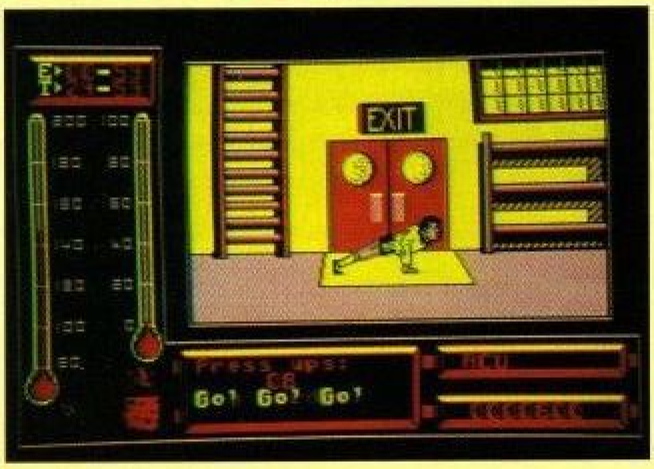
Four Soccer Simulators is neither as well programmed nor as realistic a simulation as Match Day II, but it is fast and challenging. . . plus you *do* get four games for your money.

Developer: Supersonic Software.
Tape: £9.99
Disc: £14.99

17/20

GARY LINEKER'S SUPERSKILLS

COLIN



BEING a footballer isn't all transfer fees and blazers. Vigorous gym work has to be done to increase strength and stamina. Press ups, squat thrusts, weight lifting and monkey-bar routines are all part of a balanced training regime.

After gym and a quick shower it's out to the training field, there to sharpen up the reflexes.

A slalom section is for the close-in dribbling work, and should be completed at top speed. There is a goalie at the end just to make things realistic.

The long distance shooting skills are catered for by penalty shoot-outs through tyres hung in the goalmouth. This is really a bonus stage because it is only possible to get this far if you've got the ball past the keeper. Extra points are awarded for accuracy and speed.

The final section is the ultimate test of coordination. Gremlin calls it Ball Juggling, but most folks know it as Keepy Uppies.

There is a pretty loading screen and a groovy tune accompanied by a very long scrolling message. The in-jokes are probably not funny if you know what they're about – they are definitely not funny otherwise.

The game has one very, very tiny fault. The press-ups section is totally impossible. As this is the first section, and you can't go on without completing it, you can't get anywhere with the game.

After paying all that license money, you would have thought Gremlin could have playtested it.

Do not buy this game – that term is used loosely – unless you have to get rid of money for tax reasons. You certainly won't be able to play it. A real bummer for Gremlin. Tough luck, chaps.

GREMLIN

Developer: Wise Owl Software
Tape: £9.95
Disc: £14.95

2/20

Gandalf



Lancelot

THERE are many stories and legends surrounding King Arthur and his Knights of the Round Table. Although glamourised over the years, many of the principal characters might well have existed. They may even have had some of the adventures we read of.

Among the knights recruited by King Arthur, the most well known is Lancelot. His was the example others tried to imitate. His prowess at arms and his devotion to Arthur's ideals of chivalry have given us the archetypal "knight in shining armour".

In this adventure you must guide Lancelot along his perfunctory path of perfection to the ultimate goal of finding the Holy Grail.

In addition to basic instructions and hints for the novice adventurer, the booklet which comes with the game includes a short piece on the background and the books you could read to learn more about the subject. There is also a very readable section giving a resume of the Arthurian saga.

The adventure is divided into three parts. The first deals with Lancelot's journey and arrival at Camelot. Once elevated to knighthood you automatically move on to part two. This is the longest, and involves the search for a number of wrongly imprisoned knights.

Their rescue will test Lancelot to the full; only a successful outcome will prove that he is worthy of the highest honours. Some of the knights he rescues will help him for a while, but all will eventually return to Camelot to join the Order of the Round Table.

Having gained such an enviable reputation, Lancelot can at last claim to be Guinevere's champion. His love for Arthur's wife is well documented and is a terrible burden he has to bear for the rest of his life. Penance and a devotion to the code of chivalry barely balance his passion for the Queen of England.

STAR ACU GAME

The third part, which can be played independently of the first two, continues the story some 20 years later, where your goal is to help Lancelot to find the Holy Grail.

Many years have passed. Lancelot, while still loving Guinevere, has come to accept the inevitability of his situation. He has, if anything, stronger leanings towards the absolute code of chivalry laid down by Arthur and has seen his son Galahad, the most perfect knight of all, be given the last vacant position on the Round Table.

For his part, Galahad has only a supreme belief in Divine intervention, so Lancelot must call the tune all the way. Part three is effectively one long quest and the puzzles must be completed in the correct order.

As you might expect from Level 9, the location descriptions and responses to *examine* are often detailed, adding dramatically to the atmosphere of the game.

Graphics – only available to disc users – are colourful and well drawn. Game play is slowed slightly because they are called in from disc. But the graphics do add to the already highly charged text. There are plenty of locations to explore and most objects of interest are clearly indicated in the way the text is constructed. While having the right object at the right time is important, character interaction also is a vital part of the game.

This was a time when the age of chivalry had its beginnings. With but one imperfection, Lancelot the man has always been held as "ye parfait knight". Lancelot the adventure is Level 9's best yet.

MANDARIN SOFTWARE

Developer: Level 9
Tape: £14.95
Disc: £19.95

17/20

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Racer

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V·O·L·U·M·E 2



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This machine-code megaprogram is worth the price of the compilation on its own. There's loads of screens to negotiate in a ladders and platforms extravaganza.

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All games work on Amstrad CPC 464, CPC 664 and CPC 6128 computers unless stated otherwise. You can list and adapt all the Basic files – an excellent way to improve your programming skills.

TO order please use the form on Page 73

Slot machine advice

REF your rom board project in the December issue. I have made projects before and can see no problem in making it. I have already sent away for the components.

Unfortunately I know nothing about roms. Initially I hope to upgrade my Protext from disc to rom. When I can afford to I will upgrade Prospell and then buy Utopia.

Could you please answer the following queries: Do I have to fit my Protext rom in any particular holder? How do I activate Protext? If I buy Prospell and Utopia, do I have to fit them into any particular holders? How do I activate the Prospell rom from within the Protext rom? If in the meantime I keep my Prospell disc, can I use it with Protext on rom?

J. W. Cunningham,
Bessbrook, N.Ireland.

LD: The Protext rom can be fitted into any of the sockets on the DIY rom board. It is activated by typing |PROTEXT or |P. The | character is typed by holding down Shift and pressing the @ key (to the right of the P key).

Likewise, Prospell and Utopia can fit into any available slot. Most people prefer to have Utopia in slot one. As this is the first slot initialised, Utopia's commands will then take preference over commands of a similar name in higher sockets.

For instance, if you had Utopia in slot one and Rodos in slot two, typing |FORMAT would call up the Utopia version of this command, not the Rodos one.

Both Utopia and Rodos, however, have facilities built into them that allow you to specify which rom you want to shout at.

The disc version of Prospell works in exactly the same way with Protext on rom as it does with Protext on disc. The difference is that you've suddenly got a lot more room for text – you get even more room if you have both Protext and Prospell on rom – about 38k. Buying Promerge Plus on rom – which gives you, among other things, powerful mail merge facilities and two file editing – will double that text capacity.

A hard cat is gonna fail

I WAS delighted to find in the December issue the little program that produces a hardcopy of a CAT. So I typed it into my 464, saved it to disc, powered up my DMP1 printer, inserted a second disc to catalogue and ran the program.

It worked, sort of, but with disappointing results. I get a line spacing and a left displacement problem. Can you help?

Anthony Drake,
Newcastle upon Tyne.

LD: Ah yes. Ahem. Sorry. Forgot to mention that it won't always work on the DMP1, nor on any other printer that doesn't have a built-in buffer. These sort of printers sometimes can't cope with the speed that data is being sent them.

If you can imagine your printer grabbing a letter sent to it by the CAT, printing it on the paper and then going back for another letter – any data that was sent between grabbing one letter and going back for another is simply forgotten. Printers with buffers store this overflow of data in their "memories".

I haven't got a DMP1. Try typing *MODE 0* before running it. That might help.



Exceedingly impressed

I'VE recently rejoined *ACU* after a short spell away and was exceedingly impressed to see such things as machine code and the like among the letters pages. This is to be highly commended, so please give us more! Perhaps you could start a "usefuls" page with more gems as to where things are hidden.

Consider a single byte number in some register; how can I print that number on to the screen while staying in machine code? Do I have to write a routine to convert each digit of the number to Ascii and then use &BB5A?

The second little problem I have is, how to patch the firmware to generate a catalogue with only the filenames reported.

Hope these will prove useful to other machine code dabblers.

W. M. Laidlaw,
Magdalen College, Oxford.

LD: The answer to your first two questions is yes. For any number from 0 to 9, presuming it is already in the A register, simply *add a,48* and *call &bb5a* to print the number on the screen. For larger numbers, see Programmers' Surgery in this issue.

As for a routine to generate a filename-only catalogue – one without accompanying filesizes – type |DIR. Like that you mean? Yeah? Simple:

```
ld hl,dir  ;addr of the bar command.
call &bcd4 ;kl find command.
jp &1b     ;call the bar command.

dir        ;the command name.
dm "DI"
db "R"+&80
```

Send your letters to:
Lance Davis
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Essex CM14 4EF

Dash it all!

IF M. W. Fitt will write to me, enclosing an sae, I will be happy to provide him with public domain amateur radio software to decode morse, rtty and packet.

J. M. Dunnett,
5 Queens Road, Wellington,
Somerset, TA21 9AW

The spirit is willing

THIS is not a complaint, but I was just wondering why the screen shot of Bubble Ghost in the December issue of your wonderful mag – you see, it's not a complaint – was printed upside down.

Owen White,
Ashford, Kent.

LD: Now that wasn't our fault. From the minute the Bubble Ghost game came through the door of our office we've had a couple of poltergeists (White and Mackay) floating about the place. The screen shot was the right way up, it was the rest of the magazine that was upside down. Hic.

CHR$(160) to the rescue

IF G. Matthewman wishes to use CHR$(0) in PRINT lines, CHR$(160) will do. The screen sign is different, but the effect seems to be the same. Program one of the function keys, say f0: *KEY 0,CHR$(160).*

C. J. Farrow,
Portsmouth.

LD: Well knock me down with an Amiga... It works! I wonder why.

Keyguard kops

I WORK in a school for children with physical handicaps, where we make great use of Acorn equipment. *(What? Like oak trees, you mean? LD)* We have a number of keyguards made by handy persons that are very helpful. The following jottings may be of use to your Luton reader "Cry for help", *ACU* December 1988.

Our experience suggests that accuracy can be

gained in a number of ways. Try adjusting the seat and table height to find the most comfortable combination for the child.

Try a variety of wedges under the keyboard to bring the keys forward to a more comfortable position. Try supporting the forearms or wrists – you can experiment with cushions or armrests.

Introduce activities that require the use of a small number of keys located well apart. Educational programs and games programs are usually designed in this way. It may be possible to slow some programs down with Speed Key to some advantage.

It is often found that a keyguard becomes redundant as accuracy is gained.

John Heath,
Bromsgrove.

* * *

MY husband, who has multiple sclerosis, used a key guard for an 8256 which was of some help, although not an exact fit. The firm does not make a guard for the 6128.

We received help in this matter from our local speech therapist, and your reader may want to contact her therapist.

Joyce Nisbet,
Linlithgow, Scotland.

LD: These are just two of the letters I got on this subject. Thank you to everyone who wrote, I have passed your letters on. Joyce sent me a brochure along with her letter. The firm which makes these keyguards is called Special Access Systems Ltd. They live at 4 Benson Place, Oxford, OX2 6QH (Tel 0865 56154).

I say, I say, I say

I AM 11 years old and I have been saving up for a 6128 speech synthesiser. I have enough money now. I would like to know what sort of words it can say and if it is possible to program a larger vocabulary.

John Greenhow,
Cheltenham.

LD: The Dk'tronics speech synthesiser from Ram Electronics (0252 850085) has the SPO256 speech chip in it, which gives it an almost infinite vocabulary because it has a text-to-speech converter that allows speech to be entered in normal English. It comes with software, stereo amplifier and speakers.

Light on the subject

I WANT to connect a light pen to my 664, but I don't know how to read the light pen register that I know the 6845 CRT controller has got. I can't find it anywhere in the Firmware Guide. An assembler listing that shows me how I can read this register would help a lot.

Thore Berntsen,
Barkaaker, Norway.

PC: The 6845 has two pins – 23 and 25 – which are used to enable the light pen – pin 23 high and pin 25 low. When pin 23 is high an I/O read or write is being performed. Pin 25 is low when A14 is low. So the chip is enabled when &Bxxx is either OUTted or INned.

When this happens A8 and A9 become relevant – A9 high = a read operation; A9 low = a write operation; A8 high = address register within the chip; A8 low = data. Therefore:

BCxx = Write to address register
BDxx = Write to a control register
BExx = Read from address register
BFxx = Read from a control register

When the LPSTB pin (3) of the 6845 receives a low to high transition by the effect of the screen dot passing by the pen, the logic levels of the MA lines are stored in control registers 16 (high byte) and 17 (low byte). This is the address of the screen memory byte being accessed at the time.

It can be read by first writing the control register number needed, 16 or 17, into the address register – for example *OUT &BC00,16* – and then by reading the contents of that register, *IN &BF00*.

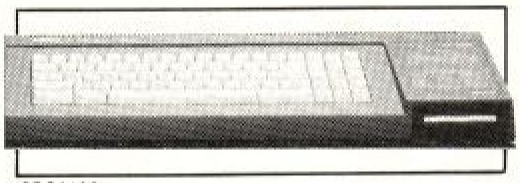
It should be noted that the address obtained is one of 16k addresses – &0000 to &3FFF. To find the actual screen address, A15 and A14 must be set or &C000 must be added.

Photo call

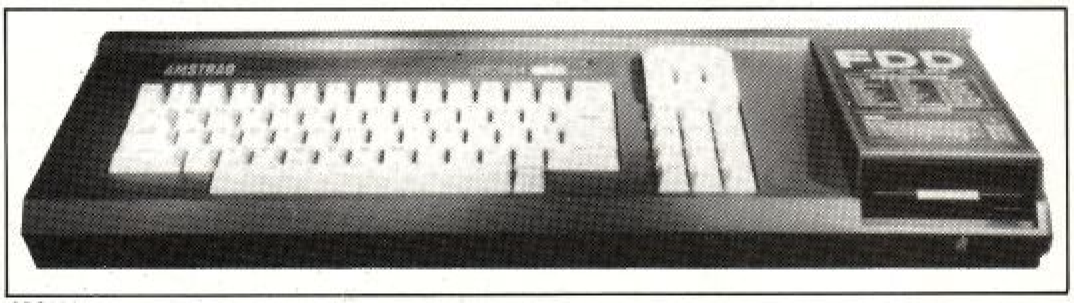
PLEASE, please, please could you show me pictures of the 664 and 6128. I am 11 years old and don't know what they look like. I have a 464, so you don't need to show that.

Gregory Osinaike,
Tottenham.

LD: Your wish is my command.



CPC6128



CPC664

Don't call us...

DEAR Auntie John, hopefully you can help me in my darkest hour. I have recently bought the Maxam assembler because I wanted to learn machine code. Unfortunately, when I enter any of your listings into the editor I find that I cannot get them to do anything.

They usually assemble with absolutely no difficulty. But why won't they *do* anything? More to the point, what should I do to make them do something?

Richard Bruce,
Comber, N.Ireland.

LD: This has got to be a wind up, hasn't it? Oh well, just in case it isn't. . . Try calling the machine code, Richard. In other words, if the origin (org) of the code is &4000, drop into Basic and type CALL &4000.

If you're looking for books on Z80 machine code, phone Computer Manuals Ltd on 021-706 6000 and ask them for their latest catalogue.

And another thing...

I AM a tender 14 and an accomplished Basic programmer. I own a 464 and I am beginning to get fed up with waiting for things to load. And, which is more to the point, with other people having better programs than me.

What I want to know is, if I buy a disc drive, say the DDI-1, would this mean I could use a program made for a business computer like the 9512? Or could I maybe even use a program for the Nimbus PC? Could the 9512 use the Nimbus discs? You see, the school has several Nimbus PCs and my brother-in-law has a 9512.

Do all business PCs run on CP/M, or does this have to be booted up and then your CP/M program loaded? If I had a disc drive would I be able to use popular languages like Turbo Pascal and stuff? Do programs for PCs have to be written specially for that PC?

What's all this about being IBM compatible? Would my 464 be IBM compatible with a DDI-1? Would a memory add-on be needed to do the things mentioned in all these questions?

I would greatly appreciate it if you could explain these compatibility problems to me in full.

Phil Marshall,
Cabragh, N.Ireland.

LD: Oh come on, Phil, for someone who boasts himself to be an accomplished Basic programmer you seem to know very little about your chosen hobby. Sigh. OK then.

No, buying a DDI-1 for your 464, which comes with CP/M 2.2 on disc (try the User Club on 091-510 8787), will not let you run all your brother-in-law's 9512 software. The two com-

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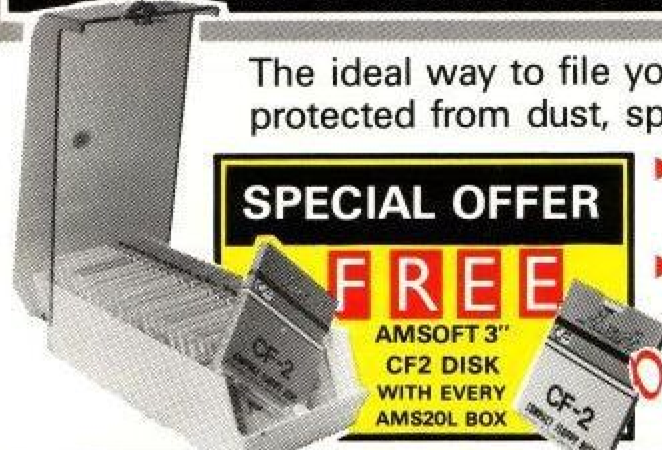
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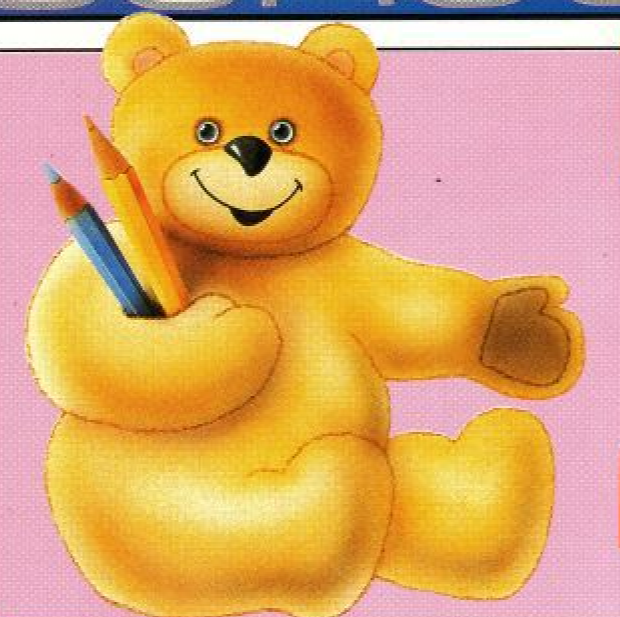
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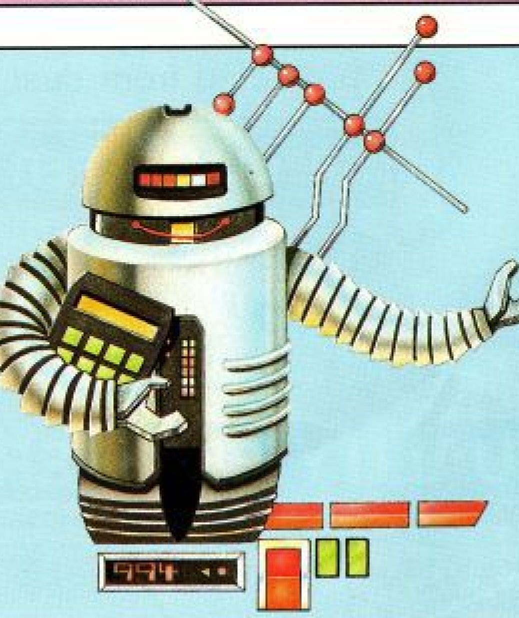
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R267

puters run different disc operating systems and the PCW9512 has 448k more memory than the CPC464. They are, to all intents and purposes, totally incompatible machines.

The Nimbus PC takes 5.25in discs, the PCW9512 takes 3in discs. You can't fit a square peg into a round hole. And most business PCs run on MSdos, not CP/M. Why? It's a long story – some other time.

A variety of popular languages are available for the CPC (try Advantage on 0242 224340). Most, if not all, run under CP/M Plus, the upgraded 6128 version of CP/M 2.2. But if you buy yourself some extra memory (try Ram Electronics on 0252 850085), you should be able to run most 6128 CP/M Plus software on your 464 and DDI-1 disc drive.

Full price rip off

I WISH to tell you and all the readers of *ACU* my honest opinion about software companies which re-release their games at £1.99. I think any company which does this is not worth bothering about.

I bought Dan Dare and Aliens for £10, and now they are out for £1.99. I feel totally ripped off. What is the point of buying £10 games when a year later they are released on hit-pack. All the games I seem to buy appear a year later either at £1.99 or on hit-pack.

I am no longer buying £10 games for the simple reason that it is a waste of money.

Graham Brett,
Ninfield, E.Sussex.

LD: You won't hear any arguments from me. For ages now the big games companies have been telling us that CPC owners don't buy full price games. You have found out the hard way why that is.

Perhaps your letter will knock it home to the software companies that you can't rip off *all* the people *all* the time.

Photo finish

PHIL Craven failed to mention where to connect the ceramic disc capacitors on his homemade rom board (ACU December 1988). After looking at the photo of the wiring I assume they are soldered to pins 28 and 14 on each of the DIL sockets.

J. Hughes,
Prescot, Merseyside.

LD: Top marks to you, Mr Hughes – you are absolutely correct. I knew that photo would come in useful. (There are those here who said it would put people off). Anyway, just to confirm your statement, each disc capacitor is wired from 5v to any side of the capacitor, to 0v.

Going for a song

I AM a budding composer of music for my Arnold. I have an excellent library of original compositions, ideal for all types of computer game, but alas I have no games to put this music to.

After listening to some of the efforts produced by some software houses, there must be a software house out there with a need for music for their games.

Gavin Tyte,
High Wycombe, Bucks.

LD: Well? Is there?

Just so much garbage

I HAVE seen in your magazine at different times the reason for certain programs not having been printed given as, "everyone does not have a disc drive", and again, "all people do not have a printer".

Well I'm very sure that more people have drives and printers than have assemblers, yet you are constantly printing source code listings that to a lot of us are just so much garbage.

What about giving us an assembler? I can't afford to buy one!

D. Mitchell,
Clacton-on-sea.

LD: An assembler listing is in the pipeline. Such an important program, however, has to be thoroughly tested and debugged before we let it loose on the general public. It'll be worth waiting for.

Knavery type-in trouble

I'VE spent the last couple of hours typing in Knavery and, despite using Proofreader, I get the message *Improper argument in 1290*. Proofreader shows the correct proofcode [01], so is this a machine error?

K. D. Muir,
Maidstone, Kent.

LD: You'll find that your typing mistake is somewhere in lines 1160 to 1270 where the *p$()* array is defined. You will have assigned one element of the array twice, for instance typing *p$(1)= ...* in line 1250 instead of *p$(10)= ...* . This will have the effect of leaving *p$(10)* empty, therefore causing an error message in line 1290 where the program attempts to do some work on the whole *p$()* array.

There were no misprints in the Knavery listing.

Bread and butter Arnold

MY wife is looking to start a up a small sandwiches business. *(Using small bread, presumably? Ed)* As this venture will initially be a one-woman concern, I was wondering if there is any software that might be adaptable to help in the organising of her orders.

My own ideas are based on a light pen selection of product categories from a screen menu of cob, brown bread, cheese, onion and so on. This information would then be collated and printed out on to individual adhesive labels in set company blocks.

Obviously, this type of organisation would enable quick progression of orders from incoming calls, and in a readily usable format.

If this type of package is not available, then I would welcome any advice offered.

P. S. Blockley,
Walsall.

LD: Erm... This type of package is definitely not available, so I've written a little program for you. I charge £150 per hour, and it took me ages and ages. Please send £3,000 in unmarked 50p pieces to urgh... thwack... umph... *(And don't come out till you're better. Ed).*

```
10 INPUT"Sandwich";a$:a$=LOWER$(a$)
20 IF a$="peanut butter"THEN 60
30 PRINT a$;". Yuck, ain't you"
40 PRINT"got no peanut butter?"
50 PRINT:GOTO 10
60 PRINT"Mmmm. Got any more?":GOTO 50
```

Coloured ribbons

AS you will no doubt gather from this letter, I have recently acquired a DMP3160 printer. I would like, if possible, to print in colours other than black, for example a blue not unlike the one used to print the word AMSTRAD on the front cover of the December issue.

Are coloured ribbons available. If so, where?

H.G. Barker,
Wigan.

LD: There's a stationers in Norfolk which does coloured ribbons for most makes of printer. Write to them, with details of your printer, at Diss Stationers, 22 St. Nicholas Street, Diss, Norfolk, IP22 3HJ.

CommStar clobbered

MOAN, grumble, gripe, whinge, *SCREAM!* Why can nobody clean out the bugs in HoneyTerm. I have been moaning at Pace since January 1988 about this, all to no avail.

It seems as if even *they* can get no joy from Chris Honey regards curing the problems out of an otherwise good package.

The most glaring problem is that HoneyTerm doesn't operate software flow control of output from disc. Try entering the Basic terminal emulator program given, using software flow control. It just doesn't work.

I'd love you to publish this moan, expanded if needed, the perhaps the action of the fan blades may reach where civility cannot.

D. Turtle,
Erith, Kent.

LD: Just goes to show that it's easier to catch bugs with honey than with vinegar. No, seriously, HoneyTerm is a nice easy comms package to use. It's not perfect, but then what software is? Have you tried any of the CP/M public domain comms programs?

Hacky New Year!

FOR those of you still coming round from the 1989 welcoming celebrations: The hard stuff at the bottom is called ground, the stuff over your head is the ceiling, the dark tackle in the mug in front of you is called strong coffee. We suggest you drink it.

Remember John "Hakman" Girvin of Belfast? Well, he's been dismantling Exolon with a bit more patience than I had – and he found the invisible sprite, too. After much head scratching, coffee drinking, hair tearing, coffee drinking, blood sweating and more coffee drinking, he's redesigned the screens a bit.

All the nasties that usually plug you have been turned into harmless wee planetoids that you can walk straight through with no problem. Ah, one problem. If you use the part of the poke that zaps the land mines, you sometimes fall to the ground. No great hassle, you just jump back out again. Any road up, here's de poke, man:

```
10 'Exolon cheat
20 'By John Girvin
30 '
40 OPENOUT"!D":MEMORY&3FF:CLOSEOUT
50 MODE 1:INK 0,0:INK 1,24:INK 2,6
60 INK 3,26:BORDER 0
70 LOAD"!loader":POKE &4154,&BE
80 addr=&BE00
90 READ byte$
100 IF byte$="exolon" THEN CALL &4000
110 POKE addr,VAL("&"+byte$)
120 addr=addr+1:GOTO 80
130 '
140 '*** Leave in 160-220 ***
150 '
160 DATA 21,32,be,dd,21,07,4a,11
170 DATA 49,05,dd,7e,01,fe,ff,20
180 DATA 04,dd,23,18,f5,dd,23,dd
190 DATA 23,dd,23,33,7e,00,be,20
200 DATA 04,dd,36,00,04,1b,7a,b3
210 DATA 20,e0,23,7e,b7,20,d4,c3
220 DATA 00,01
230 'Remove forcefields
240 DATA 01
250 'Remove stationary cannons
260 DATA 05
270 'Remove landmines
280 DATA 0c
290 'Remove hammers
300 DATA 16
310 'Remove double launchers
320 DATA 1a
330 'Remove guided missiles
340 DATA 1f
350 'Remove swarmers
360 DATA 27
370 'Remove combination launchers
380 DATA 2c,2d
390 '
400 '*** Leave 420 in ***
410 '
420 DATA 00,exolon,4a,47,0a,88
```

No checksum in that folks, so you'll have to take it on trust.

Alan Crosby from Bury St. Edmunds has sent in a sheet of Multiface II pokes for your perusal, plus some access codes. The code for Game Over II part two is 84187 and for Game Over I, free with II, you get part two with 10218. Confused? Wasn't trying hard enough then, was I? That's them thar Multiface II pokettes on the right.



Vax finds a hacking tool that is a serious hindrance to many would-be pirates

Easy Poker?

One wee collection of progettes that may come in handy for you is Poke-Easy Plus+ by Galeper Soft. This contains loads of handy bits that trim the protection off games so you can stick 'em on disc, do your own pokes, make backups and stuff like that. Anyone who uses this explicitly to rip stuff off. . . come the glorious revolution son, and you're first against the wall.

Wot it is, is a collection of bar commands – you know, ∣DISC, ∣MITZVAH – and a menu. Also, is a photocopied manual with instructions on how to fly it, many typos, and hints on finding infinite lives pokes.

Actually, as well as the expected tape-to-tape, tape-to-disc and disc-to-disc routines, there are some automatic infinite lives and levels. These are not reliable and have a helluva lot of trial and error involved anyway.

One bit, of mostly academic interest, is a

Game	Effect	Addr	Poke
Head Over Heels	infinite lives pt1	26BF	18
	infinite lives pt2	2568	C3
	infinite doughnuts	2632	18
	infinite power	4147	75
720	infinite lives	8027	00
OutRun (Sega)	infinite time	2253	00
Space Harrier	invulnerability	0D33	C9
Joe Blade	infinite ammo	105D	00
	infinite uniform	1490	00
	infinite keys	1284	00
Bubble Bobble	infinite lives...	6D26	00
	...for both players	6D87	00
Batman	infinite lives	1C90	00

Multiface II cheat sheet

command to scan through a file and spot words in it. Me old mate Ken wrote one of them and you'd be surprised at the things people conceal in their code.

Apart from messages to hackers, you sometimes find passwords, though these tend to be encrypted slightly. You also get a load of guff that is really code but just happens to look like English, or more likely double-dutch. It should spot other languages too, just for our foreign friends.

Still, there is more than one method of feline taxidermy, and there are several ways of using Poke-Easy to deprotect stuff. The easy way is to try a Power Backup. This just lets the computer guess what it ought to do next. It might get it wrong. On the other paw, it might get it right, thus saving you a lot of hassle and leaving you with more time to get on with playing the game.

Picking the lock

When Power Backup don't work there is a selection of cataloguing, info finding, speedlock blasting and file transferring programs to help you. It will deal with headerless files, odd sync bytes and protected Basic files, but glueing them together is your problem. The manual is helpful here, and although anyone could probably do it, the rank amateur will take several cracks at it and probably take up a lot of serious drinking time as well.

I tried to do a tape-to-disc backup with Dark Side, Arkanoid, Arkanoid II, Legend of Kage, Renegade (Ocean and Taito tapes), Equinox and a few others. None was transferred. Dark Side uses headerless blocks, Equinox uses its own thing, and most of the rest use Speedlock. I even tried the humble Amsoft Fruit Machine and Who Dares Wins II, which even Speedmaster would copy. Power Backup actually crashed the loading process.

For disc users, tape-to-disc is supposedly supported by Power Backup, but I never got it going. Copying headerless files to disc is also supposed to be possible. I wanted to try the disc copier on my Design Design disc – which Oddjob wouldn't copy – but it's gone walkies. I did try, in desperation, the Pepsi Challenge Mad Mix Game, which produced a *Subscript out of range in 1050* error while copying! Writing disc copiers in Basic takes some gall.

The disc copier was also not very friendly: It kept on asking me – several dozen times – to insert the disc for drive A/B, even on my two drive machine when the discs were in there already. No mention of pressing a key when you've changed discs, either.

It is not possible to leave a disc copy going while you feed the cat, as it is with Oddjob for instance, and I found this to be incredibly tiresome. I couldn't get any working discs out of it after all this anyway.

The disc directory utility did nothing significantly more than find hidden files, which can easily be done from CP/M Plus or Utopia. It failed to find files hidden on other user areas.

I tried the speedlock blaster. Oh dear. It knows nothing of the new version of Speedlock and made large CrUnCh noises. When fed with some of the older Speedlocked games it was a bit happier. With Cobra it messed up the loading screen – as documented in the manual – and the rest worked like a dream. The first success.



Defining the keys in Cybernoid II as O,R,G,Y will give you infinite lives

A Renegade tape of the same vintage failed, but other original Speedlocked titles passed.

Up and running

When a game is successfully cracked or un-Speedlocked, it is always called GAME. Power Backuped games can usually be renamed straight off, but I had to resort to Maxam and Utopia to rename Cobra. It would have been nice to have the option. You could use CP/M PIP with the [g] option to copy each BOOT and GAME file into a separate user area, and use a little Basic program called COBRA like:

```
10 REM Cobra game
20 OPENOUT"d":MEMORY HIMEM-1:CLOSEOUT
30 |USER,1
40 LOAD"BOOT",&AF00
50 CALL &AF00
```

in user area 0 to run your Cobra game which is living in user area 1. You can then have one game per area – 16 all told. This should be enough as you have 45k game files, and only 160k on a disc.

Undaunted by the failures, and realising that after Cobra something might work, I tried to put Dark Side on disc using only Poke-Easy Plus+. The |INFO command didn't tell me exactly what sort the loader file was; I had to look the file type number up in the manual. Binary. The transfer program loaded the code and copied it over to disc when I hit the key. The code was called GAME.BIN for me. I renamed it to DARKSIDE.

The next step was to load in the headerless files. A program is provided |H.INFO, which writes out the critical information on every headerless file loaded. Unfortunately the first thing many games do is to set all inks to black, and Dark Side is one of them. Poking &C9 in &BC32 and &BBFF then running the binary code after loading sorted the inks out. |H.INFO then paused and revealed a start address of C000, length of 4000 sync of 3E and a return address of 0FB9, all of which looked fairly believable.

This was all necessary because RUNing a binary file causes a complete reset – a point the author seems to have overlooked.

OK, so we got our loading screen. Next was the first code block, starting at 1C62, 8A00 long, sync of 4 and returning to FDA. This should in theory overwrite Poke-Easy, and in practice the machine reset. Unfortunately there was still one more block of code to come. A quick disassembly revealed where it went and what it was, but I doubt anyone using only Poke-Easy would have found it.

There was no call to the code, either – it used a return address of 1C62 on the stack. Stick with a disassembler and firmware manual, folks.

Down and out

|H.TRAN transferred the headerless files to disc perfectly – as GAME.BIN again – even if they were going to overwrite the Poke-Easy program. Screen files were OK, though you won't get the colour if you bodge together your own loader. Quick rebuild, and one version of Dark Side backed up to disc. Mind out though, as some games simply will not fit on a disc-based machine.

With games that load with one big headerless file, there is a patch given that loads the GAME.BIN file instead of the huge headerless file, which may or may not work.

At the end of the manual the programmer

complains about the end-of-file bug and suggests a sleazy poke for it that effectively stops the end of file from ever being reached. Does he not know that the work-around is available from the Amstrad technical support mob and is known by all and sundry in the 464 world?

There is other stuff in there that I haven't had time to go over, such as a mickey-mouseo game to demo the utilities on, a tape speeder-upper, slow motion, disc rom relocator and printer control.

Well, I dunno about the "Ultimate Game Hacking Tool" bit, as advertised on the cover. That award goes to a Z80 In Circuit Emulator with a PC attached. (Ultimate is an overused word,, a Z80 ICE will set you back upwards of six grand). This little collection doesn't seem to be able to rip the skin off a rice pudding automatically. Much kinder to think of it as a collection of handy routines.

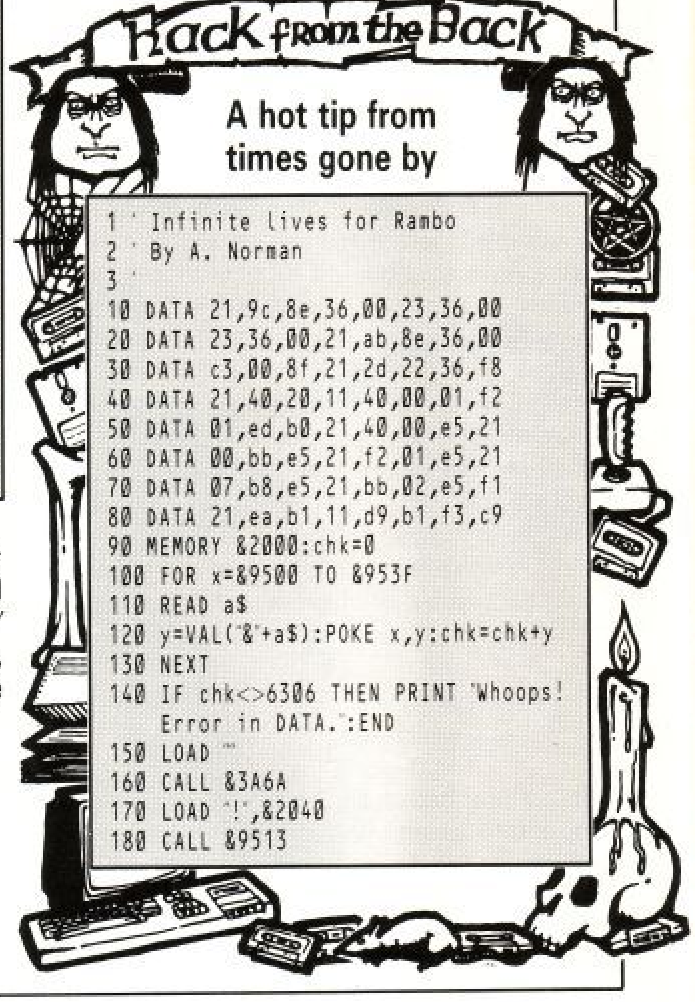
Should Poke-Easy Plus+ be able to Power Backup a game, it might be possible to use the |WRITE.POKE command to insert some of the Multiface II pokes that have been sent in recently. Costs? Well, £10.99 on tape, and £15.99 on disc, from Galeper Soft, 36 Westonlane, Bridgetown, Totnes, Devon, TQ9 5UN. (Tel: 0803 864784).

And now some stuffs from me ol' mate Justin, the man so tough that he makes a point of shaving with a dot matrix printer.

```
5 ' Infinite lives and ammo
6 ' for Cybernoid II.
7 ' (c) Justin for ACU.
8 '
10 MODE 1:MEMORY 12345
20 tot=0
30 FOR n=&80 TO &97
40 READ a$:a=VAL("&"+a$)
50 POKE n,a:tot=tot+a
60 NEXT n
70 IF tot<>2027 THEN PRINT"data error
   .":END
80 LOAD ""
90 CALL &80
100 DATA 21,8e,00,22,ab,a0,3e,20
110 DATA 32,8a,a0,c3,00,a0,af,32
120 DATA 6b,2b,32,2f,16,c3,00,01
```

Next from Justin is infinite shields for Domark's The Empire Strikes Back. First rewind the game tape to the start. Then Type *LOAD ""* and press Return. Now type in the routine below, exactly, with the *same* line numbers. Finally, type *RUN*. Yur tis:

```
72 FOR n=&100 TO &10F
74 READ a$:POKE n,VAL("&"+a$)
76 NEXT n
78 CALL &100
400 DATA 21,09,01,22,99,85,c3,5d
410 DATA 85,af,32,f6,07,c3,00,80
```




```
1 ' Infinite lives for Rambo
2 ' By A. Norman
3 '
10 DATA 21,9c,8e,36,00,23,36,00
20 DATA 23,36,00,21,ab,8e,36,00
30 DATA c3,00,8f,21,2d,22,36,f8
40 DATA 21,40,20,11,40,00,01,f2
50 DATA 01,ed,b0,21,40,00,e5,21
60 DATA 00,bb,e5,21,f2,01,e5,21
70 DATA 07,b8,e5,21,bb,02,e5,f1
80 DATA 21,ea,b1,11,d9,b1,f3,c9
90 MEMORY &2000:chk=0
100 FOR x=&9500 TO &953F
110 READ a$
120 y=VAL("&"+a$):POKE x,y:chk=chk+y
130 NEXT
140 IF chk<>6306 THEN PRINT "Whoops!
    Error in DATA.":END
150 LOAD ""
160 CALL &3A6A
170 LOAD "!",&2040
180 CALL &9513
```

PROGRAMMERS' SURGERY

Ian Sharpe gets to grips with your coding conundrums



AS former *CPC Computing* readers will know, this section provides help with your programming problems. I concentrate mainly on Basic and machine code because that's what most people use, but there's no reason why occasional detours can't be made into Forth, C, or whatever else turns you on.

The main criteria are that your query can be answered without needing an *n* part series, and that it will be of use to other readers. Beyond that, just about anything goes. Some months we'll devote the entire column to a particular problem, perhaps stretching over two months if necessary, while in other issues I'll deal with minor ailments.

All levels of ability will be catered for, so no matter how trivial or difficult your problem might seem, you've nothing to lose by sending it to me.

Quite a few letters have been rolling in over recent months, so I'm going to clear up some smaller points which have been causing consternation.

RSXs from machine code

Alan Bailey of Wolverhampton is a few months into machine code. He has a 464 and a disc drive, and wants to know how to do the equivalent of ¦DISC, ¦DRIVE and so on.

Fortunately it is pretty straightforward. You can access any bar command – be it a rom's external command or an RSX set up by another ram-resident machine code program.

The basic technique is to supply the firmware routine KL FIND COMMAND with the name of the command you're looking for, and it will find the address for you. All you have to do then is call the address supplied. Listing I shows you how to find and call ¦DISC:

The command name to be found by &bcd4 must be stored in upper case letters, and with bit seven of the last letter set. In effect this means you have to add 128 (&80 in hex) to its Ascii value. I've shown it the way Maxam handles it. Maxam 1.5 owners can use *str "DISC"* for the same effect. Other assemblers may work slightly differently.

When the firmware routine has been called, it returns with the carry flag false – *nc* in assembler – if it couldn't locate the command you asked it to find. In Listing I this causes the program to beep and abort.

If the command is found, carry is true and the HL register contains the address of the routine. The C register holds the rom select address – the rom number the command was found in if it wasn't a ram-resident RSX.

Now when you call a machine code routine from Basic the A register holds the number of parameters with which you followed the bar command or CALL. If you try to follow ¦DISC with parameters – it doesn't require any – it will give you an error report.

Therefore, if when you call the ¦DISC routine from machine code the A register is anything other than zero, it will give you the same result – *Bad command*. That's the reason for the *xor a* instruction, it's a quick way of zeroing the accumulator.

Next we summon another firmware routine. This one is a quick way of calling a routine which may not be in ram. Instead of having to enable the appropriate rom, store the old rom state, call the routine and restore the previous rom selection in separate stages, &001b does it all in one go. C and HL must be set up in the same way as &bcd4 left them after finding the command, so off it goes and does a ¦DISC.

This technique allows you to use, say, Bankmanager or your Utopia rom without having to work out where all the routines live. It is another example of Locomotive's thoroughness when designing the firmware which makes

```
; Accessing an RSX or external
; command from machine code.

org &8000

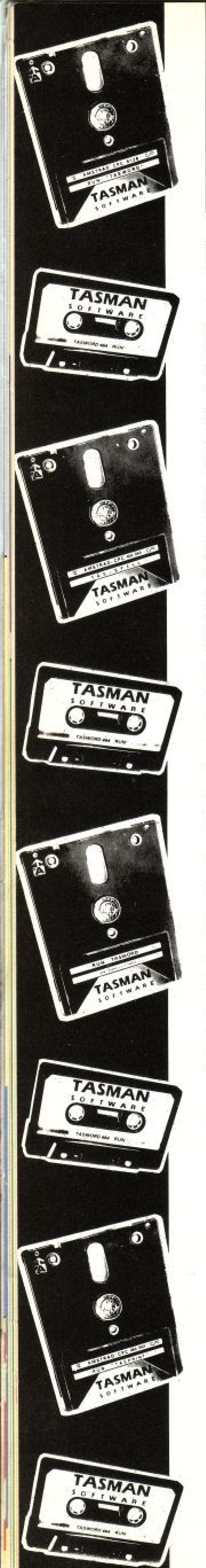
ld hl,name   ; Point HL at name.
call &bcd4   ; Ask f/ware to find it.
jr nc,error  ; Carry false=not found.
             ; Else, command found ok.
             ; C=rom select address.
             ; HL=address of routine.
xor a        ; A=0. Important!
call &001b   ; Far call
             ; to DISC routine.
;
; rest
; of
; program
;

ret

error        ; Command not found
ld a,7       ; so beep and abort.
jp &bb5a

name
text "DIS","C"+&80
             ; Must be upper case and
             ; with bit 7 set on last
             ; character.
```

Listing I



SOFTWARE THAT'S HARD TO BEAT

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machine code on the CPC relatively easy.

It's worth noting that the low level disc routines such as to read and write sectors can also be used in this way. They all have command names such as |CTRL+F, which is |<character 6>. Don't forget that the top bit must be set in the name.

These routines are all documented in the most recent firmware manual – Soft 968 – which covers all three machines. CPC464 owners in the market for a firmware guide should go for this one instead of the earlier Soft 158.

If you want to use a command which takes parameters such as |DRIVE – although in this case you'd probably use |A and |B in order to keep things simple – you need to call the routine with the A register holding the number of parameters and the IX register pointing to a parameter block that you've constructed to look like one set up by Basic.

Displaying decimals

One of the biggest problems with learning assembler is that simple things which you take for granted in Basic need a specially written routine to achieve in machine code.

This is the problem facing Gordon Taylor of London. He's been playing round with arithmetic and wants to print the results on the screen as decimal numbers. Although he's found out about the firmware routines for printing characters, he can't find how to turn a 16 bit number into anything other than two seemingly irrelevant characters.

Straight after a calculation a 16 bit number is stored in memory in low byte/high byte format, which is, in effect, the number represented in base 256. This base 256 number has to be converted to base 10, and the individual digits further translated to the Ascii values of the characters 0 to 9.

Listing II is a program segment to convert and print the number in *num* which must, of course, be primed with a number before you call the routine.

The basic idea is to take the number and do repeated subtractions of 10,000 until it passes zero. The number of times this is possible is the fifth digit (leftmost) in the decimal representation, and adding 48 to it produces the Ascii value of the number, which is printed.

The remainder from the subtraction is itself treated in the same way but with 1,000 being knocked off. The number of times the routine can do this before generating a carry is the next digit in the sequence. The process is repeated with 100, 10 and 1.

If that's confusing, think of the number 54,321. Successive subtractions of 10,000 gives five before going past zero. Adding this to 48 gives us 53, the Ascii value of the digit 5. The remainder is 4,321. You can subtract 1,000 four times before generating a carry leaving 321. 48+4=52, which is Ascii for the digit 4. Further cycles generate the remaining digits.

Perhaps there is a quicker or shorter method of achieving the same result, but it's 2.30am and this little lot was due in yesterday, so I'm not going to try. If anybody out there has something better, send it in and I'll put it in a future column.

```
; Print a decimal number from
; its 16 bit value.

ld c,5        ; FIve decimal digits.
ld hl,(num)   ; The 16 bit number.
ld(tmp),hl    ; Temp storage.
ld hl,table   ; Point at powers of
              ; 10 table.
getpower
ld e,(hl)     ; Get 10 power into DE.
inc hl
ld d,(hl)
inc hl
push hl       ; Save table pointer.
ld b,0        ; B counts subtractions.
ld hl,(tmp)   ; Get current number val.

subtract      ; Repeated subtractions
              ; of power of 10 from
              ; remainder of number
              ; from previous time
              ; through this bit.
and 0         ; Zero carry flag.
sbc hl,de     ; Subtract.
jr c,nosub    ; If carry, done.
inc b         ; Else increment counter
jr subtract   ; and play it again.

nosub
add hl,de     ; Undo final subtraction
ld(tmp),hl    ; and save result for
              ; next run through
              ; subtract routine.
ld a,b        ; Get counter into A.
add 48        ; Make Ascii value.
call &bb5a    ; Print digit.
pop hl        ; Retrieve table pointer.
dec c         ; Decrement counter.
ret z         ; If 0 then job done.
jp getpower   ; Else do next digit.

table
dw 10000      ; Powers of 10.
dw 1000
dw 100
dw 10
dw 1

num
rmem 2 ; <-- Put your number in here.
tmp
rmem 2        ; Temporary storage.
```

Listing II

Down in the dumps

I've lost count of the number of screen dumps that have appeared in books and magazines over the last four years. Despite that, there are always newcomers who have missed them.

Colin Stubbs of Preston is one such. He's got hold of a book which lists a screen dump, and he's been trying to use it. The trouble is that it is written in Basic and takes 45 minutes to print the screen. This is a bit excessive when all he wants is a quick record of the text.

For your purposes it would be far quicker to send the text one character at a time, thus reducing the amount of work to be done. You can do this with a machine code program, but it's simple to implement from Basic.

What follows is a version for 664/6128 owners. Even though it's in Basic, it only takes a minute. Just GOSUB to it at the point in your program where you want the dump, or run it as a stand-alone program:

```
10 FOR y=1 TO 25
20 FOR x=1 TO 80
30 LOCATE x,y
40 a$=COPYCHR$(#0)
50 IF a$<" "THEN a$=" "
60 PRINT#8,a$;
70 NEXT:PRINT#8:NEXT
```

The technique being used is to LOCATE the text cursor at each point on the screen, read the character there with COPYCHR$, and send it to the printer. Line 50 filters out unrecognised characters such as bits of graphics and replaces them with a space. You need to alter the 80 in line 20 to 40 or 20 if you're using a Mode 1 or 0 screen.

The 464 doesn't have a COPYCHR$ command, which is the bit that reads text from the screen. To get round this, when you first switch on, or after a reset, you need to run this program:

```
10 DATA ee,01,c0,dd,6e,00,dd
20 DATA 66,01,36,01,23,7e,23
30 DATA 66,6f,cd,60,bb,77,c9
40 MEMORY HIMEM-21:m=HIMEM+1
50 FOR i=m TO m+20
60 READ a$:v=VAL("&"+a$)
70 c=c+v:POKE i,v:NEXT
80 IF c<>2358 THEN PRINT"Error in dat
   a":STOP
```

Now it is possible for 464 owners to read characters from the screen. Just set up a string with a character in it, and *CALL HIMEM+1,@ a$* will put the character at the current text cursor position into *a$*.

This has many uses, and can be put into service as part of a slightly modified screen dump:

```
100 a$=" ":FOR y=1 TO 25
110 FOR x=1 TO 80
120 LOCATE x,y
130 CALL HIMEM+1,@a$
140 IF a$<" " THEN a$=" "
150 PRINT#8,a$;
160 NEXT:PRINT#8:NEXT
```

The machine code routine behind this is simple enough. It finds the address of the first character in the string and forces the string length to one character in case you passed something larger. Firmware call &bb60 is then used to find the character at the current cursor position, which is then put into the string before returning to Basic.

If you have a programming problem you would like Ian to help you with – be it for Basic, machine code or any other computer language – write to him at: ***Programmers' Surgery, Amstrad Computer User, 169 Kings Road, Brentwood, CM14 4EF.***

LONG ago, when reviewing games was still an art, games were different. With almost every new one there was a new concept. Those were heady days; machines had 64k maximum, programmers had acne and tape boxes fitted tapes exactly.

Every week a game came along that "defied description" – a quaint way of saying that either the reviewer was short in the vocabulary department, or that the editor had blue-pencilled screeds of lovingly crafted prose.

Since time began – well, mid 'seventies at least – games have often featured a bat moving about knocking out bricks with a ball. You've probably played them all so much that playing blindfolded is no problem. But I bet you haven't played one where the bat moves in eight directions.

To say that Titan is purely a demolition job is very unfair. It has also got the fastest scroll this side of the dedicated hardware department, and needs some serious lateral thinking. There is a likelihood of description being defied with Titan because it mixes more game elements than are probably legal.

The plot is typically French – long nights on the herbal cigarettes have been spent on this one. In 2114 in Vegapolis there exists one Mr Hibrys who, as far as analytic conceptors are concerned, is one stone-righteous dude. He's the man behind Titan, a new leisure dimension which is drawing crowds faster than L. S. Lowry.

There is also the small question of a 1,000 Kronur – so far in the future, and *still* they can't spell – prize if all the synthetic landscapes can be demolished.

The trouble is, nobody has done it yet, and failure is fatal. So in 2114 Vegapolis you'll get into the spelling checker or undertaking business if you know which side your synthebread is synthebuttered on.

Standard issue is a magnetic bat with eight directional faces. The power ball – just "ball" to you and me – rebounds of the bat and the solid scenery. Everything moves about at a fair old rate; all is smoothness and speed.

The scroll is so fast that it can cause faint nausea akin to sea sickness after a particularly long session – a feeling Mission Genocide players will be familiar with.

Littered about the landscape are the skulls of past competitors. If you or your ball hit a white one, you act the cat and lose one ninth of your lives. Green skulls – Vegapolis is a multi-lifeformed community – are nasty for the ball, but your bat can eat them.

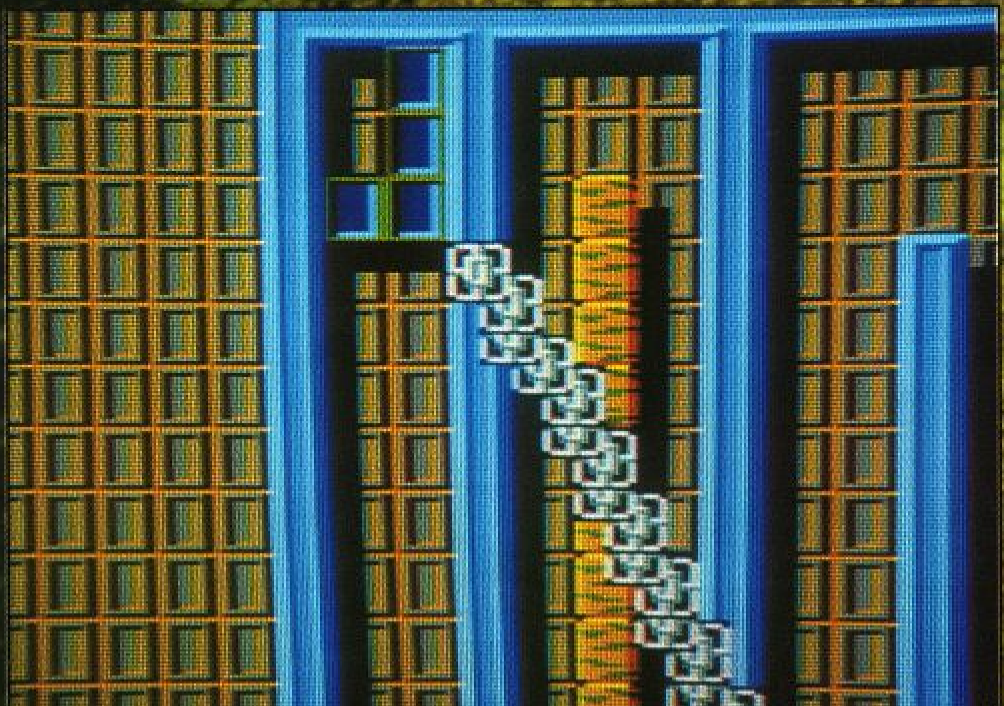
Eating skulls? I told you this game wasn't normal.

There are many different types of block, from the utterly harmless disappearing block to the definitely a bit odd appearing block. Some rise up every time the bat crosses them, until after about five crossings they become solid. Once solid, further crossings are no longer a viable proposition.

Another type of block only allows the bat to pass; yet another type only the ball, so a

TASK FOR A TITAN

Stewart Russell reviews a game from France that is so new it's still wet from crossing the Channel



An energiser block swaps the bat and ball positions around

screen of these causes deep anger and resentment.

A real nasty is the oil spot, which causes the bat to slide uncontrollably. The same effect can be observed by placing a throw-rug on a polished wooden floor and waiting.

An energiser block, spotted by its prominent E, for reasons best known to itself swaps the bat and ball positions around. Movable blocks can be shifted à la Xor, and are handy for preventing rebounds. Lastly, there is the exit block, which moves you on to the next level if hit.

TITAN is is nearly a Breakout clone, is almost an Xor ripoff and is definitely inspired by Boulder Dash. It's an arcade game that has never seen an arcade, so it doesn't have one of those licensing deals tagged on it.

Beyond that, comparisons fail. So it is really out on its own. Dash it all, I may have to go the whole hog here and say that Titan is downright original.

But is it good? Yes, it's very good. Exceedingly good. Mindblowingly unmediocre even. It's got that elusive spark that you never see in a mass produced conversion. It's got *panache*.

So it might have a long scrolling message – nothing new or astonishing there – but this is the first scrolling message with a classical fable in it: The Fox and the Crow.

Titan is easy enough to play straight away, yet difficult enough to take a while to finish. It is also fun enough to keep playing until you do finish. All that needs to be said has been said, except for: Avoid screen 21.

STAR ACU GAME

TITUS™

Developer: Titus.

Tape: £9.95

Disc: £14.95

20/20



Really nasty are the oil spots (blue patch, to left) which cause the bat to slide uncontrollably



Littered about the landscape are the skulls of past competitors



Some of the 80 levels are massive mazes, 10 times the size of this screen shot

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Room with a view

Auntie John shows the girl of his dreams how to do it on the CPC screen

AUNTIE John looked around the crowed room. It was worse than he had expected. And he had expected something that was pretty bad. The room was stifling hot. Condensation trickled down the windows. Shirts were a nasty shade of yellow at the armpits. People stood in queues, staring at the back of the person's head in front, trying not to notice the dandruff.

AJ sighed and joined the shortest queue, casting his mind back to the night before, which he had spent slumped over his computer.

He caught himself examining the head of the person in front of him with considerable interest. The top of it just came up to his line of sight. It was covered with long, auburn hair and there was not a trace of dandruff. The owner turned round, recognition twinkling in her eyes.

"You're Auntie John", she cried. "I don't suppose you could tell me how the CPC screen memory is laid out could you?"

AJ gulped with surprise. He hadn't been expecting this. He took a deep breath and smiled.

"Why of course. But this queue isn't moving very fast, why don't we find somewhere to sit down?"

"Good idea", she said. "There's a little cafe just around the corner, let's go there".

"Fine", said AJ, and led the way to the exit. He paused, holding the door open for her. She smiled and walked through.

Pass the source

A short walk later they were facing each other across a red, checked table cloth, with two cups of steaming coffee beside them.

"The problem is this", she started. "I want to be able to print large graphics anywhere on the screen, but Basic is too slow and the firmware isn't much better. I've been thinking of a look-up table approach, but I'm not sure how to go about it".

"It's not too difficult once you've sussed how the screen data is laid out. Here look at this". AJ produced a pen from his jacket and proceeded to write out a section of the screen memory on a table napkin (see Figure I).

"The screen memory takes up a whole 16k. It's not arranged in a simple sequential pattern, but is influenced by the character positions. The screen is easiest to understand if you split it up into its 200 horizontal lines, with each line starting with a certain address and continuing for 80 bytes. You may notice that 200 x 80 is not exactly 16k (16,384), but 16,000".

"Oh yes", said the girl, "that must have something to do with scrolling the screen, musn't it?"

"Yes exactly", continued AJ. "Immediately after a MODE statement the screen is laid out in the way I've drawn on the napkin. But when the screen scrolls, the addresses change and some memory that wasn't previously visible suddenly appears. It's an interesting effect, and worth studying, but let's keep things simple."

He took a slurp of coffee and carried on. "Since each of the 200 horizontal lines has a unique address, and any address on that line can be easily calculated by adding a simple offset, it would make sense to put each of these addresses in a look-up table".

"I see", said the girl, "but hadn't we better get back to the DHSS? They'll be closing for lunch soon". AJ agreed.

Benchmarks

By the time they got back to the DHSS it was almost deserted, so they signed their respective names and left within the space of several minutes. They continued their conversation while walking through the park.

"So how would I use the look-up table?" she inquired.

"Hmm. That requires some arithmetic. To clarify the situation, what we need is a routine that when given an X coordinate and a Y coordinate, returns the screen address for that point. The coordinate specifies which of the addresses stored in our look-up table we need to access and the X coordinate determines the offset to be added to it".

"Each address in the look-up table uses two bytes, doesn't it?" said the girl. "So if we took the Y-coordinate, which would be in the range zero to 199, multiplied it by two and added it to the start address of the look-up table, we would get the

Line	Address				
0	C000	C001	C002	up to	C04F
1	C800	C801	C802	up to	C84F
2	D000	D001	D002	up to	D04F
3	D800	D801	D802	up to	D84F
4	E000	E001	E002	up to	E04F
5	E800	E801	E802	up to	E84F
6	F000	F001	F002	up to	F04F
7	F800	F801	F802	up to	F84F
8	C050	C051	C052	up to	C09F
9	C850	C851	C852	up to	C89F
:	:	:	:	:	:
:	:	:	:	:	:
198	F780	F781	F782	up to	F7CF
199	FF80	FF81	FF82	up to	FFCF

Figure I: The CPC screen memory (addresses are in hexadecimal)

```
; Input
;
; E register contains Y-coordinate.
;
; Output
;
; BC register contains screen addr.
;
; Note
;
; A look-up table of the 200
; possible addresses is required.

ld hl,address_of_table

ld d,0          ;Ensure D will not
                ;effect addition.
sla e           ;Multiply E by two.
add hl,de       ;HL now is addr of addr.
ld a,(hl)       ;Get LSB of addr,
ld c,a          ;and store it in C.
inc hl          ;Point HL to MSB.
ld a,(hl)       ;Get MSB of address,
ld b,a          ;and store it in B.

end             ;BC contains scr addr.
```

Figure II: Getting the screen address from a look-up table

BrunWord

"BrunWord offers considerable flexibility . . . excellent spelling checker . . . very easy to use datafile" – CWTA
"BrunWord is a very competent programme" – AMTIX
"Real value for money . . . user friendly and fast" – Amstrad Action

Buying a word processor is not easy and this is made even more difficult if you already have one that is not suitable. So often, the owner of a new Amstrad rushes out and buys a simple word processor when what he is really looking for is one that is easy to use.

In programming terms this represents a major challenge. Complexity and ease of use are normally far apart but there is a compromise. Take the find and replace routine. BrunWord only allows the case of the replacing word or phrase to be specified and even then will copy the case of the first letter from the original. This is what is wanted 99% of the time. Protext has all the options except this one, so usually requires two attempts to achieve what BrunWord does without asking.

The whole purpose of using a word processor is to make life easier. In simple terms, it must do all that the typist wants but without being a pain to use. This means to us that a compromise is in order and what we have tried to do is illustrated in the find and replace routine. BrunWord does not have the most facilities. We have deliberately removed all the odds and ends that are not normally used but have included a spelling checker and card filing programme as standard features.

Speed of operation is also very important. 14 seconds after typing RUN "BRUNWORD", the word processor, spelling checker and 30,000 word dictionary are all in the memory ready for immediate use.

The convenience of this just cannot be appreciated until it is used. Imagine, you are typing an article and cannot spell "necessary". Your best try is NECXSRY. All you do is put the cursor on the word, press the <F3> key and then press H for help. Half a second later the correct word is displayed on the screen. Press T for Transfer and the word is corrected and you continue typing. No other CPC word processor can test and correct a spelling error in this way.

BrunWord is fast in everything it does. We have simulated typing into BrunWord at 218 words per minute which is faster than the word record. There is no noticeable delay in response and the programme is only ambling along at this speed.

Many word processors use a simple method of justifying text that either makes the middle bulge or makes the text lopsided. BrunWord has a superb system where spaces are first added after punctuation and then between words alternating left and right towards the centre of the line. This gives the text a balanced pleasing appearance.

Good printer control is also important. BrunWord will operate correctly with any printer and has 38 printer control characters that can be embedded in the text. The 18 standard characters each send 3 codes to the printer while the 20 special characters each send 10 codes to the printer. All these can be used without upsetting the justification and with only one space added.

BrunWord always displays the true print format with the page boundaries clearly shown with ..P....P... across the screen.

Another unique feature of BrunWord is its memory filing system. When making severe changes it is often necessary to save sections of text for use later or for adding to another file. Normally, these would be saved back to the disc with the difficulty of using a name that makes the content obvious and resulting in the disc becoming congested with small files.

We do not claim to have totally solved this problem but BrunWord does allow a number of files to be stored in memory so that immediate access is possible. The great advantage is that these can be saved to the real disc along with the main file (under the same name) or left in the memory for adding to another main file.

Getting started in BrunWord couldn't be easier. On the disc is a TUTOR which we ask you to work through before opening the manual. The idea is to get the newcomer straight into word processing and feeling like a BrunWord expert. It takes about 20 minutes to run through the tutor, seeing the fast formatting, centring a line and a paragraph, changing margins, insetting a paragraph and so on. And then finally correcting the five deliberate spelling errors. After that we expect you to feel confident to go it alone with an occasional reference to the 40 page manual.

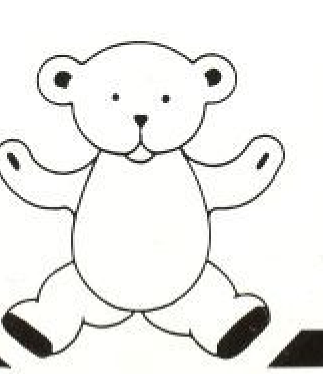
The text of this leaflet was printed directly from BrunWord using an Epson RX80 printer and Qualitas.

How They Compare

	BrunWord 6128 & BrunSpell	Protext Disc & Prospell	Tasword 6128 & Taspell
Typing into 241 word paragraph. Typing at start of 22k of text.	>218 w/m >218 w/m	>218 w/m >218 w/m	16 w/m 150 w/m
Scroll to end, line by line. Fast scroll to end.	1 min 27 sec 8 sec	2 min 2 sec 8 sec	2 min 25 sec 20 sec
Justify paragraph of 241 words. Justify whole 22k of text. Justify and preview whole text.	1 sec 1 min 2 sec 1 min 2 sec	<1 sec 11 sec not possible	34 sec not possible not possible
Change appearance to format, and Appearance to Format.	17 sec	17 sec	53 sec
Loading 22K file. Saving 22k file. File size on disc. Margins and TABs saved with file. Printer setup saved with file.	10 sec 14 sec 21 K yes yes	7 sec 11 sec 22 K yes no	29 sec 29 sec 22 K no no
Spelling Check 3366 words. Average speed. Disc changes.	52 sec 3883 w/m None	6 min 24 sec 526 w/m 8	18 min 46 sec 179 w/m 3
Test word at cursor, in 22K file.	<1 sec	not possible	not possible
Text space word processor only. Text space with spelling checker.	24067 chars 24067 chars	23300 chars 10579 chars	65276 chars 65276 chars
Screen Format - columns. Page boundaries	40, 80 or 128 shown	40 or 80 not shown	80 only not shown

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Info-Script 6128 with BrunWord & BrunSpell . £36.00
with backup copy and Disc Utilities . £46.00
Qualitas with BrunWord 6128 loader £14.95
(All supplied on 3in Disc - state which machine)

screen address, wouldn't we?"

"We would get the *address* of the screen address," corrected AJ. "We would need to peek the first address to get the second. The first address is like the number of a house, the second address is contained within the house". He wrote a short program on an income support form he had been given in the DHSS (see Figure II).

"Oh, right", she said, "and then adding the X coordinate is just a simple ADD instruction?"

"Yes, but it must be a 16 bit ADD. Although the

```
; Input
;
; BC contains screen address.
; L contains X-coordinate.
;
; Output
;
; HL contains updated screen addr.

ld h,0          ;ensure H will not
                ;effect result.
add hl,de

end    ;HL contains new scr addr.
```

Figure III: Adding the X offset to the screen address

X coordinate offset is only 8 bit, the result is a full 16". (see Figure III).

"So now we have the address, how do we use it to print something?"

"A simple loop-within-a-loop will print a graphic of any given size. What is more difficult to calculate is the way that each pixel is represented on the screen. The mode the screen is in determines how each byte on the screen is treated – either as a colour code several bits long, or as a simple on/off flag".

"Ahh", she said, "that must be why different modes have different resolutions and different numbers of colours. The memory used stays constant – it is how it is treated that changes."

"Yes, that's right. In Mode 2, which is the highest resolution mode, each byte on the screen controls eight pixels. Each bit in the byte is either set to one, to indicate that the pixel is drawn in foreground colour, or reset to zero, to indicate background colour".

"How about Mode 1 then?" she asked, laughing as his face screwed up.

"Yeuch. It's awful", he said, "the bits are all

Mode 2

```
Pixel * * * * * * * *
Bit   7 6 5 4 3 2 1 0
```

Example: Only the end pixels are on. byte value is 129 (or 128+1).

Mode 1

```
Pixel *   *   *   *
Bit   3,7 2,6 1,5 0,4
```

Example: The left-most pixel only, in ink number 2. byte value 8.

Mode 0

```
Pixel *       *
Bit   1,5,3,7 0,4,2,6
```

Example: The rightmost pixel only, with ink number 9. byte value 65.

Figure IV: Modes and pixels. The bit number describes the power of two that the bit represents in the byte. For example, bit 0 has a value of 1, bit 1 has a value of 2. They can be expressed as "two to the power of n" where n is the bit number

over the place. Each byte controls four pixels. This means that each pixel has two bits controlling it, so four colours are possible. Mode 0 is similar, but two pixels are controlled by each byte, allowing 16 colours".

He made another drawing, indicating how each bit related to each pixel for each of the modes (see Figure IV).

"Working out the data for, say, a space invader involves lots of squared paper and a calculator. It's not very exciting".

"Couldn't you peek the screen?" she asked. "Why not draw the space invader directly on the screen with an art program, or PLOT and DRAW it, and then peek each address in turn, noting the values?"

"Yes, I suppose you could do that. You could even write a program in Basic to PEEK the screen and produce a data file that could be loaded into your machine code later. Yes, that's a good idea".

"You still haven't told me how to go about putting the data on the screen", she said.

"It's just a matter of linking the routines that return the screen address for a given coordinate

```
for down=1 to 10
get scrn addr
for across=1 to 4
read graphics data from table
poke graphics data into scrn addr
update scrn addr
next across
next down
```

Figure V: Poking data into memory. In a high level pseudo-code the routine is as above, assuming the graphic is 10 lines down by 4 bytes across

with two loops. The outer loop controls which horizontal line is to be poked into memory, and the inner loop does the actual poking. Like this..." He produced an example (see Figure V).

"Yes, that's simple enough", she said. "I could write a program to do that. As an input it has an X coordinate, a Y coordinate and the address of the graphics data. It also needs to be told how big the graphics data is, I mean how many bytes across and how many down" (see Figure VI).

"Yeah. This simple program has its limitations though. For a start it is not pixel accurate, but byte accurate. Also it will obliterate anything underneath it – proper sprites will preserve what is under them, and reprint it. But routines like that can be added to your program without much hassle. Even XORing the screen data with the graphics data will produce some good results".

"Oh yes, that's because XORing the data twice will produce a result that is equal to whatever was there before you started. Like 42 XOR 12 is 38, and 38 XOR 12 is 42. Clever. Well, I'd better be getting back home".

"Hold on!" said AJ. "You haven't even told me your name."

"My name?" said the girl. "Oh that's easy, it's..."

"...John! Are you up yet? You'll be late!"

AJ rolled over and blinked his eyes. It was his mother calling him.

He sighed.

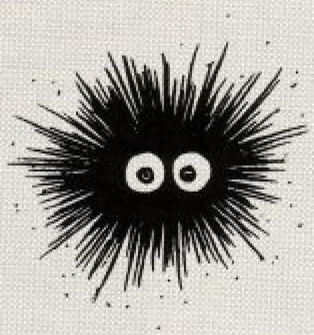
```
; The data in ".graphics_data" is a character sized block
; that will be drawn in ink three if Mode 1 is used.
;
; Input
;
; D contains the X-coordinate (from 0 to 79).
; E contains the Y-coordinate (from 0 to 199).
; HL points to a graphics table. The first two bytes in the
; table are the width and height of the graphics shape.
ld d,40                 ;Some example data.
ld e,50
ld hl,graphics_table

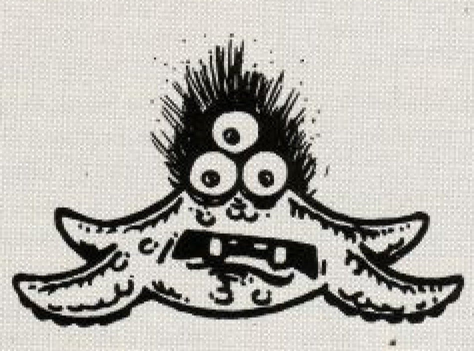
 .print_routine
ld a,(hl)               ;The height and width of
ld b,a                  ;the graphics character is
inc hl                  ;read from the table and
ld a,(hl)               ;stored in the BC register
ld c,a                  ;pair.
inc hl
;
 .loopa                 ;This is the outer or "down" loop.
push bc
ld b,c
push de
push bc
push hl
;
ld c,d                  ;This module calculates the
```

Figure VI: The finished program

PROGRAMMING

```
ld b,0                  ;screen address for coordinates
ld d,0                  ;stored in the D and E registers.
sla e
rl d
ld hl,table
add hl,de
ld a,(hl)
inc hl
ld d,a
ld a,(hl)
ld h,a
ld l,d
add hl,bc
;
; At this point, DE contains the graphics data,
; and HL the screen address. The data is read into
; the A register and then poked into memory.
; The loop ".loopb" performs this action until
; the entire line of data has been poked in this way.
; This is the inner or "across" loop.
;
pop de
pop bc
 .loopb
ld a,(de)
ld (hl),a
inc hl:inc de
djnz loopb
;
pop hl
ex de,hl
inc e
pop bc
```



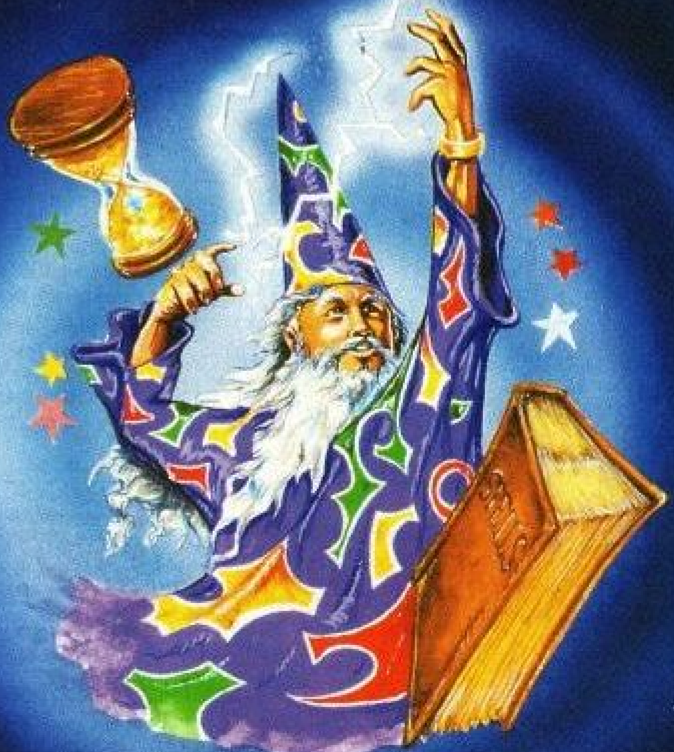


```
djnz loopa
ret
 .table
dw &c000,&c800,&d000,&d800,&e000,&e800,&f000,&f800
dw &c050,&c850,&d050,&d850,&e050,&e850,&f050,&f850
dw &c0a0,&c8a0,&d0a0,&d8a0,&e0a0,&e8a0,&f0a0,&f8a0
dw &c0f0,&c8f0,&d0f0,&d8f0,&e0f0,&e8f0,&f0f0,&f8f0
dw &c140,&c940,&d140,&d940,&e140,&e940,&f140,&f940
dw &c190,&c990,&d190,&d990,&e190,&e990,&f190,&f990
dw &c1e0,&c9e0,&d1e0,&d9e0,&e1e0,&e9e0,&f1e0,&f9e0
dw &c230,&ca30,&d230,&da30,&e230,&ea30,&f230,&fa30
dw &c280,&ca80,&d280,&da80,&e280,&ea80,&f280,&fa80
dw &c2d0,&cad0,&d2d0,&dad0,&e2d0,&ead0,&f2d0,&fad0
dw &c320,&cb20,&d320,&db20,&e320,&eb20,&f320,&fb20
dw &c370,&cb70,&d370,&db70,&e370,&eb70,&f370,&fb70
dw &c3c0,&cbc0,&d3c0,&dbc0,&e3c0,&ebc0,&f3c0,&fbc0
dw &c410,&cc10,&d410,&dc10,&e410,&ec10,&f410,&fc10
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dw &c690,&ce90,&d690,&de90,&e690,&ee90,&f690,&fe90
dw &c6e0,&cee0,&d6e0,&dee0,&e6e0,&eee0,&f6e0,&fee0
dw &c730,&cf30,&d730,&df30,&e730,&ef30,&f730,&ff30
dw &c780,&cf80,&d780,&df80,&e780,&ef80,&f780;&ff80

 .graphics_table
db 8,2
db 255,255,255,255,255,255,255,255
db 255,255,255,255,255,255,255,255
```

Time and magik

The trilogy

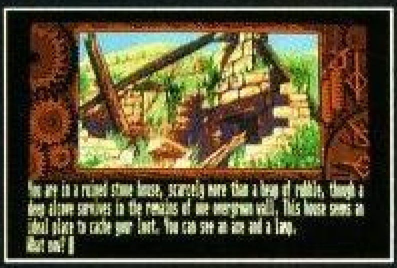


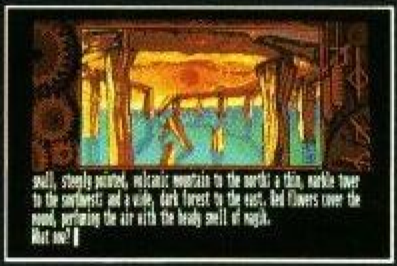
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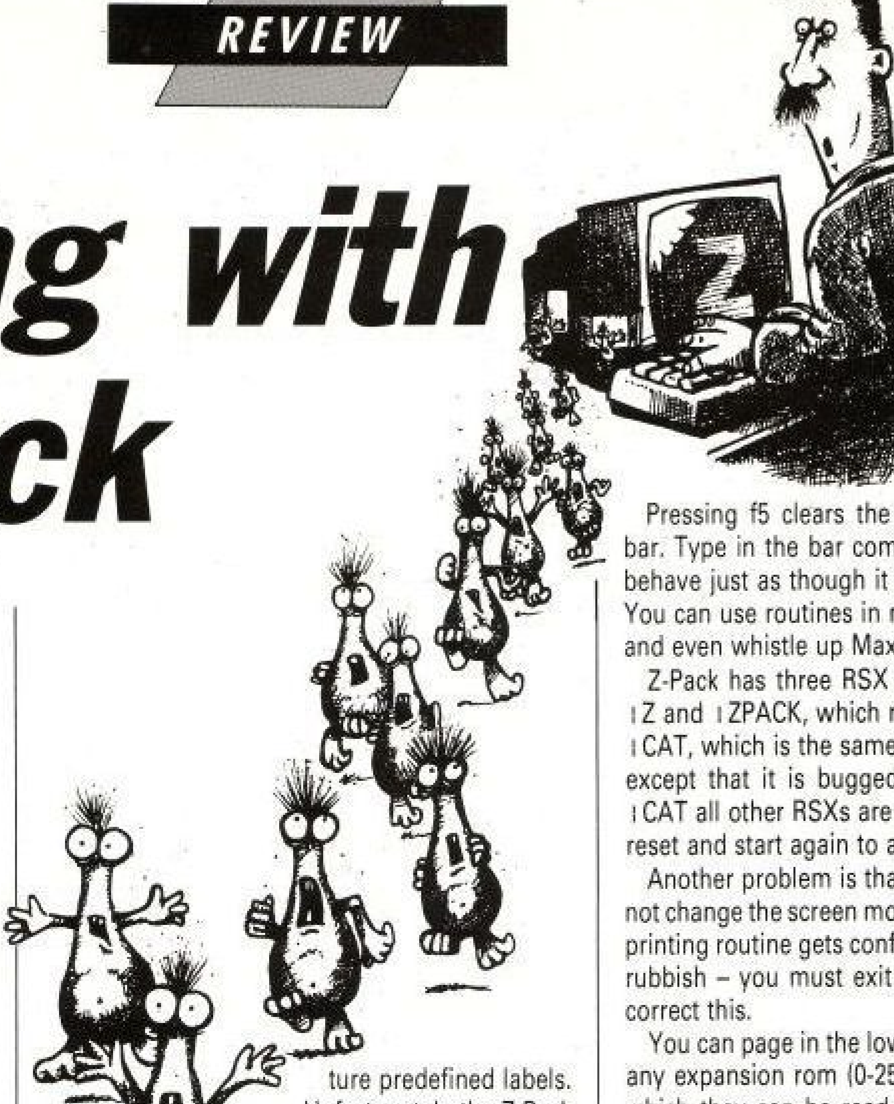
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Running with the pack



Alastair Scott finds that speed is of the essence, but not at the cost of getting in the way

IF you want to program in machine code you'll need two applications to help you – an assembler and a monitor-disassembler. Zenith Software's Z-Pack is the latest example of the latter. There are two versions – 64k and 128k – on opposite sides of the disc.

On loading a small program is read in; it can be edited to produce different colours, or the value of HIMEM can be altered. Once loaded, you are in the memory editor. The screen clears to Mode 2 and 384 bytes, starting at &0000, are displayed in hex and Ascii. The current address, plus 8 bit and 16 bit representations of the current byte, are displayed in hex and decimal at the top of the screen.

You can scroll through memory using the cursor keys with optional Shift and Control for faster movement, using the Tab key to jump between hex and Ascii input. Bytes are entered at the current address by overtyping the old values with new values.

An interesting feature is that the Clr key toggles between showing Ascii characters as is and converting them to printable characters by reducing them to the range 0-127, with control characters replaced by a full stop.

All keyed up

Z-Pack's most powerful features are unleashed by pressing a function key, at which point a menu drops down and the relevant text or prompts appear.

Pressing f0 gets you a help page, giving information about which keys to press. It also displays the location of the markers (see f4).

The memory pointer can be changed by pressing f1. This lets you jump to any location without having to scroll through pages of bytes.

The disassembler – accessed by pressing f2 – is standard Z80; its output can either be laid over the display of bytes or the whole screen can be used, in which case Ascii values are also displayed.

A given block of memory can be disassembled directly to disc or printer. The disc file is standard Ascii format and thus can be read directly by Maxam or any word processor. These files feature predefined labels. Unfortunately the Z-Pack format isn't perfect – if you add code to such a file the labels will become meaningless because the displacements will change (see right). But it's better than nothing. With a word processor or a good search and replace command, the labels can be changed to something more comprehensible.

The *rst* commands, which are CPC specific and confuse many assemblers, are disassembled correctly with the right number of parameters.

Crude breakpoints are also provided. You type the byte &F7 at the current address, then run your code. Whenever the breakpoint is reached the values of the Z80 registers, plus stack pointer and program counter, are displayed. Pressing any key continues with program execution., or pressing the Escape key drops you back into Z-Pack. There is no single stepping, which is a pity.

A calculator is available by pressing f3. Type in an expression, and it will be evaluated using integer arithmetic. The four arithmetic operators + – * / and the logical operators AND XOR and OR are all allowed.

Numbers can be in hex, decimal or binary, and must lie in the range 0 to 65535. You must be very careful – calculations are worked out from left to right and the normal order of precedence, which is * / + –, doesn't apply. For example: 100/10+10 = 10+10 = 20 but 10+100/10 = 110/10 = 11.

While moving around memory, pressing the Copy key twice at different places will mark the start and end of a block. Pressing f4 will allow you to move the block unintelligently – JPs, CALLs and the like are not altered – save it to tape or disc, dump it to printer, or find a string of bytes. The string can be Ascii, hex or both, but wildcards are not permitted.

A unique feature is that the block can be filled with a byte which is the result of a simple calculation done with the calculator.

Pressing f5 clears the screen and displays a bar. Type in the bar command name and it will behave just as though it were typed from Basic. You can use routines in ram or expansion roms, and even whistle up Maxam.

Z-Pack has three RSX commands of its own; |Z and |ZPACK, which re-run the program, and |CAT, which is the same as the Basic command except that it is bugged – if you use Z-Packs' |CAT all other RSXs are turned off; you have to reset and start again to access them.

Another problem is that an external RSX must not change the screen mode: if it does, the Z-Pack printing routine gets confused and starts printing rubbish – you must exit to Basic and restart to correct this.

You can page in the lower and upper roms and any expansion rom (0-251) from option f6, after which they can be read by the memory editor. The 128k version also allows you to view and alter the second bank of ram – but no more if you have more than 128k.

Normal disassembler
```
A000 LD B,255
A001 CALL &BB5A
A004 DJNZ &A001
```

"Perfect" disassembler
```
LD B,255
.LBL A001
CALL &BB5A
DJNZ LBLA001
```

Z-Pack disassembler
```
.LBL A001 EQU &A001
.
.
.
LD B,255
CALL &BB5A
DJNZ LBLA001
```

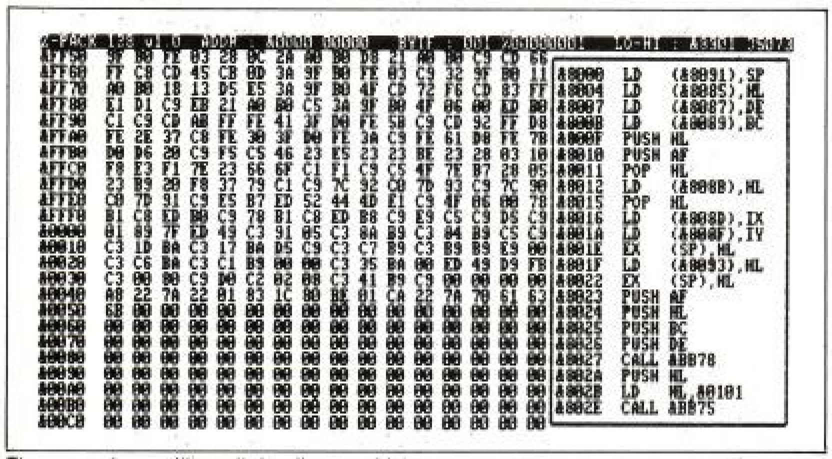
The problem with Z-Pack's disassembler

Two of the options allow you to overwrite the firmware jumpblock with ram banks. This will crash the computer, so why include them?

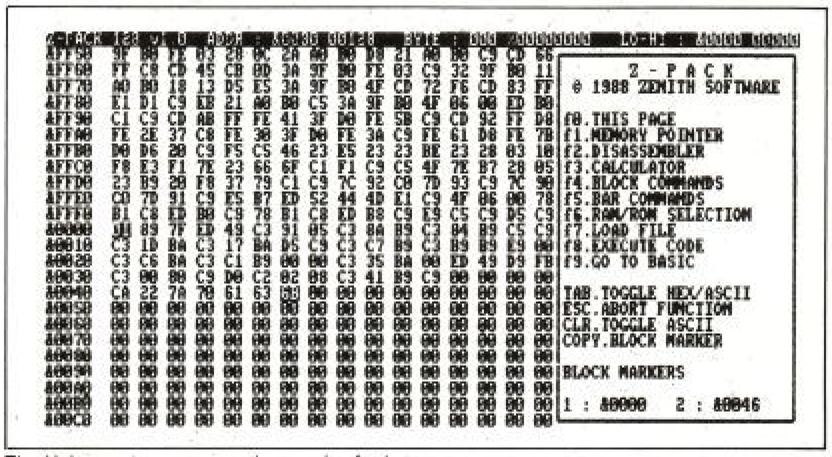
On the plus side, no part of memory cannot be viewed or altered where appropriate. The 128k version uses bank 1 of the extra 64k, so it obviously isn't a good idea to alter that bank.

Option f7 lets you load a binary file from tape or disc to any address. It also provides a rudimentary header reader. A check is made, preventing Z-Pack from being accidentally overwritten.

Option f8 executes code from a chosen



The cursor keys will scroll the disassembly



The Help page appears at the touch of a key

address, and option f9 returns you to Basic.

For a privately produced program, Z-Pack is certainly well presented. It has a 12 page printed manual, which is comprehensive with lots of examples. The only serious omission is a section on how Z-Pack affects user memory – absolutely crucial if you're going to be debugging longer programs that may not fit around it.

Z-Pack's most remarkable feature is its speed. The notoriously slow firmware routines that print a character on the screen have been replaced by specialised code, consequently it is possible to whizz quickly through memory. A further advantage is that output won't be affected if you write a routine that alters the printing firmware routines.

A toggle between medium and high resolution would have been nice, particularly in the full screen disassembler, which looks rather odd with output only covering about half the width of the screen.

In fact, most things are very well done, although the |CAT bug needs fixing urgently and the labelling system in the disassembler could be improved.

However, problems turn up with a vengeance when you look at memory usage. The 128k version sets HIMEM to &7FFF, the 64k to &76F1. All memory above there cannot be used because it is taken up by Z-Pack. This is very inconvenient – most people prefer to put their shorter machine code routines at &8000 or higher.

This problem occurs with most ram-based utilities, but I have seen 128k-specific routines which behave like pseudo roms; they take up a few bytes of user memory and store most of their code in the banked ram. So why can't Z-Pack do likewise?

It is *imperative* that a machine code monitor takes up as little user memory as possible. A program that isn't relocatable and takes up 11k of the most important area of memory is really little more than a nuisance.

Z-Pack costs £10.95 (464/664/6128 disc only) from Zenith Software, 11 Bude Street, Appledore, Bideford, EX39 1PS.

Eating bread and honey



Simple Accounts Routine (for the 6128 running the full CP/M Plus Protext) costs £16.50 on disc. Available from Thompson Computers, 8 Hyholmes, Bretton, Peterborough, PE3 8LG.

Steve Williams finds that ease of use and flexibility add up to a simple accounts routine

ACCOUNTANCY is amazing fun. OK, I told a lie. Accountancy is not amazing fun. In fact adding up figures is only slightly less mind-numbing than watching an entire episode of The Little and Large Show. Nevertheless, every month several thousands of perfectly normal human beings are forced to sit down and wade through invoices, standing orders and Vat returns.

These poor unfortunates are known collectively as small businessmen. Fortunately, for them, those clever little people at Thompson Computers have leapt to their aid.

Simple Accounts Routine is a financial package which works under CP/M Plus in tandem with the full CP/M Plus version of Protext. The program is menu driven, using the Promerge mail merge commands, plus the Protext exec and macro facilities.

The manual's 14 pages are bound in a sturdy plastic folder. I found it well written and easy to understand. Once I got past the initial setting up phase, I found the program pretty straightforward too.

You boot up CP/M Plus and run Protext. In command mode you enter *X AM*. You enter the date. When all of this has been safely accomplished you can start the accounts routine by entering *X THOMP*.

To begin the initial session you have to set up your opening balance, after which you can enter some details. These can be transaction credits/debits or information about standing orders. The latter are particularly well catered for because you are given the option to enter, amend or even merge the information.

You are prompted to enter the transaction date, a description – maximum of 25 characters including spaces – the net amount and finally the Vat amount.

The total amount is worked out and all the entries are displayed on the screen. You will be asked to confirm if the entries are correct. If you have made a mistake Simple Accounts Routine scraps the entry and takes you back to the beginning of the section.

You can get a printed list for all transactions in a particular month, or you can print lists for quarterly Vat submissions.

Entering the data is a very tedious process but this is not the program's fault, merely the nature of the task. After a while you begin to long for the odd Space Invader to appear, or even wish the prompts could be a bit more cryptic.

Minor niggles rest on the fact that Vat discount or addition is not automatically calculated. I had to dig out my calculator. But Promerge can only handle one calculation loop at a time, so it is not so much a fault of Simple Accounts Routine as a limitation of Promerge.

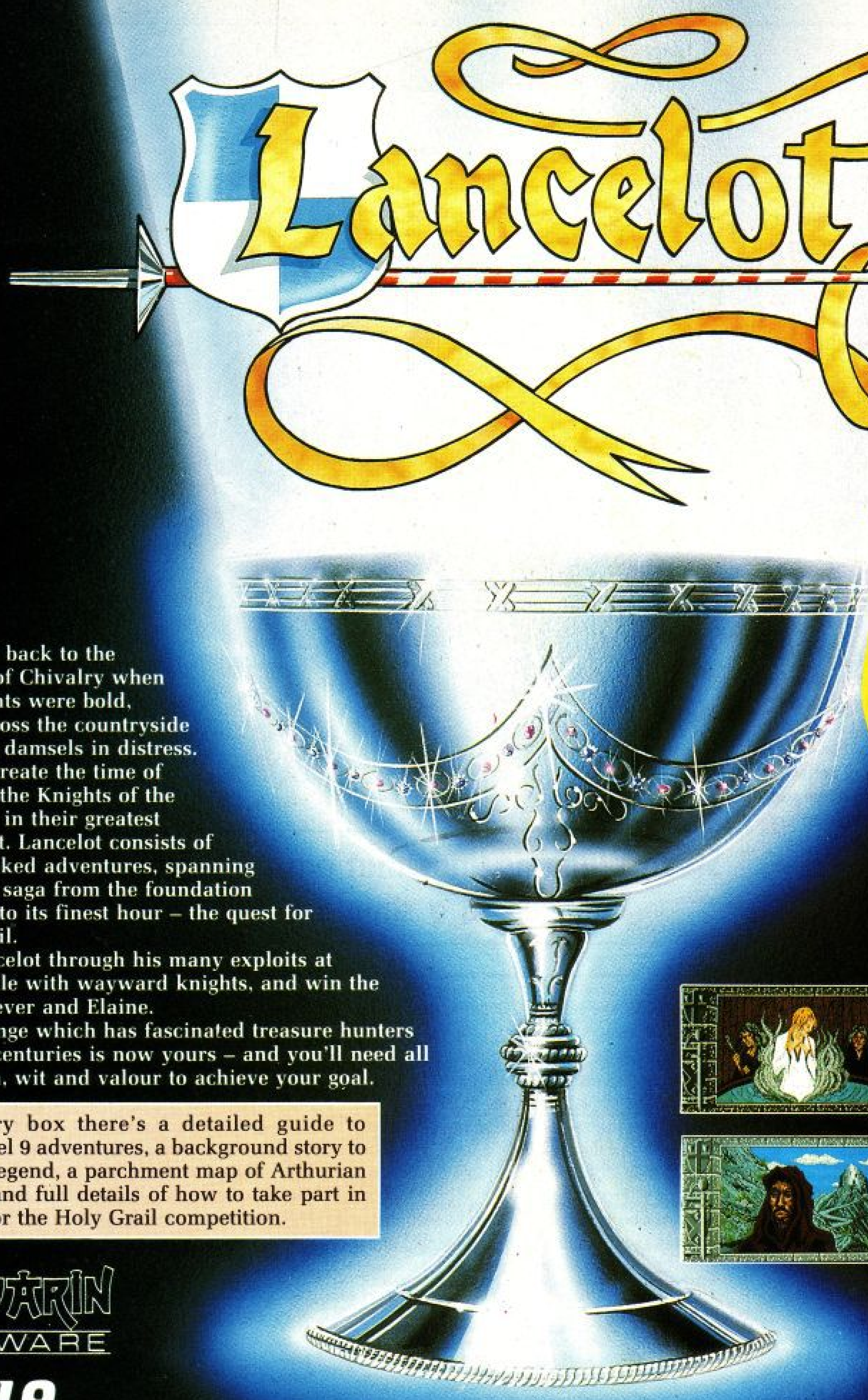
The routine is slow. This is understandable since it is an interpreted language running under CP/M – it takes time to access the various data and text files the routine creates. The speed, or rather the lack of it, must be considered as a trade-off against flexibility.

The very fact that Simple Accounts Routine runs under Promerge gives the user an opportunity to tweek the package to his or her own needs. For example, if you don't like the menu layout it is simplicity itself to load the menu file into Protext and change it.

It is hard to wax lyrical about something as mundane as an accountancy package. At the end of the day it either works or it doesn't. This one does, competently.

```
***********************************************************
*                                                         *
*  Thompson Computers Simple Accounts      (v 1.01)       *
*                                                         *
*  MENU                        The Date is  25/12/88      *
*                                                         *
*  Enter Credit Details.............................1     *
*  Enter Debit Details..............................2     *
*  Print Vat Details................................3     *
*  Print Monthly Details............................4     *
*  Set Opening Balance..............................5     *
*  Display Current Balance..........................6     *
*  Enter/Amend Standing Order Details...............7     *
*  Merge Standing Orders............................8     *
*  Print Standing Order Details.....................9     *
*                                                         *
*  To End Program...................................E     *
*                                                         *
***********************************************************
            Enter Choice 1-9 or E
```

The main menu



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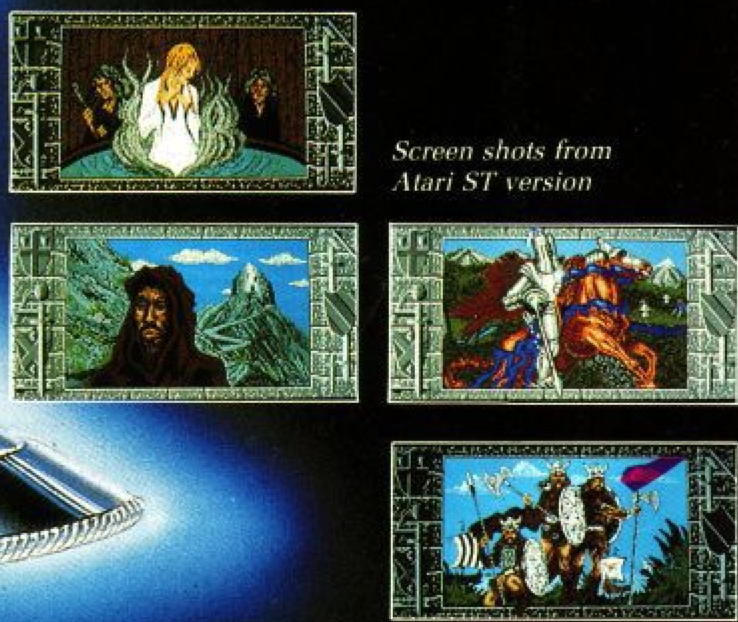
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Screen shots from Atari ST version

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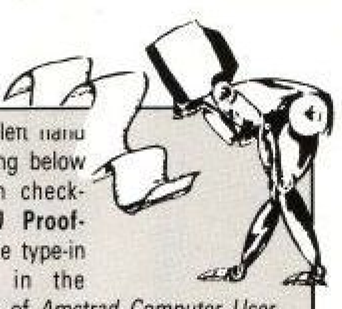
Escape from Stingy's Castle

IT'S over a month since Christmas. You're still on your way home from *that* party when you are approached by a drift of snowmen. Apparently one of their friends, Frostee, has wandered into Stingy Scrooge's nearby castle and can't find his way out. Can you help return him to his friends?

The snowmen give you a candle, some green jellies and some snowballs. Inside the castle you find Frostee who, being well made and therefore dense, can only bounce around the walls in the hope of finding a door. But the castle is so warm that Frostee the snowman is gradually melting. You must help him escape before he melts away.

You can move around (as the candle) using joystick or cursor keys. Press Fire or Copy to turn into an immobile green jelly. Press P and you can place either a jelly or a snowball anywhere in the room. Use the candle as a cursor to select the required position. Frostee slides off jellies at a random right-angles and bounces back off snowballs as if they are walls.

If Frostee hits the candle or one of the scolding hot braziers, or if the Meltometer reaches zero, it's game over.



The figures in the left hand column of the listing below show it has been check-summed by **ACU Proofreader**, the real-time type-in tester published in the January 1989 issue of *Amstrad Computer User*. You don't need **ACU Proofreader** to be able to run this listing, but having it makes spotting typing errors very easy.



Try your hand at this tricky maze game for the CPC by Paul Robson

```
[F1] 10 ' Escape from Stingy's Castle
[F2] 20 ' By Paul Robson
[F3] 30 '
[41] 40 ON ERROR GOTO 1580
[E0] 50 MODE 1:FOR f=0 TO 3:INK f,0:N
     EXT:BORDER 0
[05] 60 GOSUB 1590:GOSUB 1270:pr=&A7F
     8:q=&A85F:DEFINT r,s
[9A] 70 MODE 0:PAPER 0:CLS:INK 1,0:LO
     CATE 5,7:PEN 1:PRINT"PLEASE PRES
     S":LOCATE 8,10:PRINT i$"1"i$" OR
      "i$"2"i$
[31] 80 LOCATE 6,16:PEN 2:PRINT"1.JOY
     STICK":LOCATE 6,19:PRINT"2.KEYBOA
     RD"
[55] 90 INK 0,15:INK 1,0:INK 2,26:BOR
     DER 15
[3A] 100 IF INKEY(64)=0 THEN up=72:do
     =73:ri=75:le=74:fi=76:GOTO 110 E
     LSE IF INKEY(65)=0 THEN up=0:do=
     2:ri=1:le=8:fi=9:GOTO 110 ELSE 1
     00
[5B] 110 RESTORE:rm=50:rg=5:c=1:me=13
     :me2=0
[63] 120 pb2=0:CALL &A823:IF rm=70 TH
     EN 860
[D3] 130 srm=0:IF rm=66 THEN srm=66:r
     m=54 ELSE IF rm=67 THEN srm=67:r
     m=52 ELSE IF rm=68 THEN srm=68:r
     m=50
[F5] 140 IF rm=65 THEN PEN 13:CALL &A
     86F
[99] 150 PEN 1:CALL &A583,rm:nxt=0:pb
     =0:gs=0:ss=0
[A4] 160 IF srm<>0 THEN rm=srm
[14] 170 READ n:IF n=-1 THEN READ s:I
     F s=rm THEN 190
[39] 180 GOTO 170
[56] 190 READ h,v,h2,v2,d
[12] 200 CALL &8057,h2,v2,2
[81] 210 ERASE nr:DIM nr(15):x=1
[F1] 220 READ n:IF n=0 THEN 250
[40] 230 READ o,p:nr(x)=n:nr(x+1)=o:n
     r(x+2)=p:PRINT tr$:CALL pr,n,o,2
     47,10:PRINT op$
[C8] 240 x=x+3:GOTO 220
[29] 250 READ n:IF n=0 THEN 270
[94] 260 READ o:PRINT tr$:CALL pr,n,o
     ,243,8:PRINT op$:GOTO 250
[5F] 270 READ n:IF n=0 THEN 290
[3A] 280 READ o:LOCATE n,o:PEN 6:PRIN
     T b$:GOTO 270
[24] 290 IF rm=50 THEN FOR i=4 TO 17:
     PRINT tr$:CALL pr,i,10,243,8:PRI
     NT op$:NEXT:LOCATE 11,10:PRINT"
     ":LOCATE 11,11:PRINT" "
[E9] 300 IF rm=59 THEN LOCATE 11,14:P
     EN 13:PRINT b$ ELSE IF rm=61 THE
     N LOCATE 3,23:PEN 5:PRINT"*!ALL
     THE BEST!*"
[51] 310 IF rm=62 THEN LOCATE 8,14:PE
     N 13:PRINT b$ ELSE IF rm=63 THEN
      LOCATE 8,4:PAPER 1:PEN 3:PRINT
     CHR$(94)"WAY OUT ":PAPER 0:ss=1
[A7] 320 IF rm=64 THEN LOCATE 7,13:PE
     N 10:PRINT"SORRY!" ELSE IF rm=67
      THEN LOCATE 16,21:PEN 1:PRINT C
     HR$(94)
[ED] 330 IF rm=68 THEN FOR i=20 TO 21
     :LOCATE 4,i:PEN 1:PRINT STRING$(
     13,b$);:PEN 13:PRINT b$:NEXT:LOC
     ATE 4,22:PEN 13:PRINT"*DO NOT ER
     ASE*":LOCATE 4,23:PRINT"SIGNED-S
     CROOGE"
[69] 340 LOCATE 1,3:PEN 12:PRINT STRI
     NG$(me,b$):LOCATE 1,3:PEN 7:PAPE
     R 12
[0F] 350 FOR j=1 TO me:PRINT MID$(m$,
     j,1);:NEXT:PAPER 0
[CF] 360 WINDOW#1,1,20,1,2:PAPER #1,0
     :PEN #1,1
[E8] 370 PRINT#1,i$"P"i$"LACE BLOCK";:G
     OSUB 1250
[A2] 380 c=c+1:IF c=6 THEN c=7 ELSE I
     F c=15 THEN c=1
[D8] 390 POKE q,c:POKE q+14,c:POKE q+
     15,c:CALL &A841
[C0] 400 EVERY 10 GOSUB 1000
[2A] 410 IF pb AND NOT pb2 OR nxt THE
```

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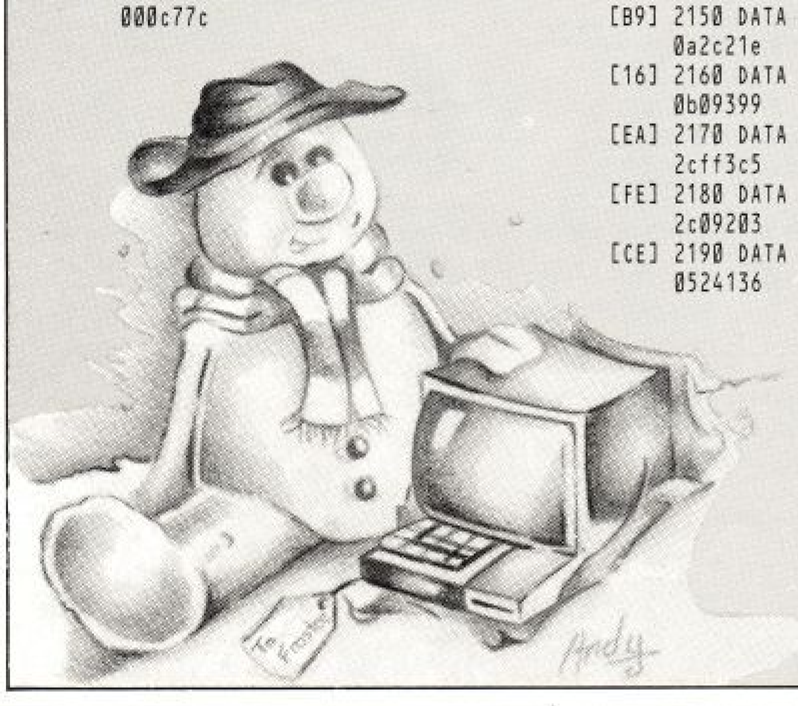
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```
      N 560
[2C] 420 CALL &8057,h,v,1
[73] 430 IF ss=1 AND h2=14 AND v2=12
      THEN FOR del=1 TO 40:NEXT
[A5] 440 IF INKEY(27)=0 AND pb=0 THEN
      1080
[32] 450 IF d=1 THEN t=-20:t2=424 ELS
      E IF d=2 THEN t=-20:t2=378 ELSE
      IF d=3 THEN t=12:t2=408 ELSE IF
      d=4 THEN t=-42:t2=408
[06] 460 t3=TEST((h*32)+t,t2-(v*16))
[81] 470 IF t3=6 THEN GOSUB 1020:GOTO
      450
[F5] 480 IF t3=1 THEN 550
[26] 490 CALL &8057,h,v,0
[2D] 500 v=v-(2 AND d=1)+(2 AND d=2):
      h=h-(d=3)+(d=4)
[32] 510 IF t3=10 THEN 1190
[F2] 520 IF t3=0 THEN 560
[E7] 530 IF t3=4 OR t3=5 THEN x=h2:y=
      v2:e=4:GOTO 940
[7D] 540 IF t3=8 OR t3=9 THEN x=h:y=v
      :e=8:GOTO 940
[FC] 550 IF d=2 THEN d=1:GOTO 450 ELS
      E IF d=1 THEN d=2:GOTO 450 ELSE
      IF d=3 THEN d=4:GOTO 450 ELSE IF
      d=4 THEN d=3:GOTO 450
[54] 560 IF INKEY(fi)=0 THEN rg=11-rg
      :CALL &8057,h2,v2,0:sw=1:GOTO 77
      0
[7E] 570 IF TEST((h2*32)-16,392-(v2*1
      6))=0 THEN x=h:y=v:e=4:GOTO 940
[C8] 580 IF rg=6 THEN 800
[74] 590 IF INKEY(up)=0 THEN dir=-20:
      dir2=424:GOTO 670
[A3] 600 IF INKEY(do)=0 THEN dir=-20:
      dir2=378:GOTO 670
[74] 610 IF INKEY(ri)=0 THEN dir=12:d
      ir2=408:GOTO 670
[2E] 620 IF INKEY(le)=0 THEN dir=-52:
      dir2=408:GOTO 670
[61] 630 IF INKEY(67)=0 THEN 110
[DE] 640 IF me=0 THEN x=h:y=v:GOTO 94
      0
[26] 650 IF gs THEN 1100
[16] 660 GOTO 410
[98] 670 t6=TEST((h2*32)+dir,dir2-(v2
      *16))
[44] 680 IF rm=68 AND h2=4 AND v2=22
      THEN PRINT TR$:CALL pr,18,8,247,
      10:PRINT op$
[6D] 690 IF t6=1 OR t6=6 OR t6=10 THE
      N 800
[EB] 700 CALL &8057,h2,v2,0
[C6] 710 h2=h2-(dir=12)+(dir=-52)
[72] 720 v2=v2-(2 AND dir2=424)+(2 AN
      D dir2=378)
[1D] 730 CALL &8057,h2,v2,2
[49] 740 IF t6=8 OR t6=9 THEN x=h2:y=
      v2:e=8:GOTO 940
[8B] 750 IF t6=2 OR t6=3 THEN x=h:y=v
      :e=4:GOTO 940
[34] 760 GOTO 800
[61] 770 IF rg=6 THEN 790
[C1] 780 CALL &8057,h2,v2,2:GOTO 800
[C0] 790 LOCATE h2,v2:PEN 6:PRINT CHR
      $(242):LOCATE h2,v2+1:PRINT b$
[99] 800 IF sw=1 THEN sw=0:FOR del=1
      TO 100:NEXT
[FE] 810 sw=0
[22] 820 IF gs THEN 1100
[66] 830 IF h2=h AND v2=v AND nxt THE
      N 120
[E7] 840 IF nxt=1 THEN FOR del=1 TO 5
      0:NEXT:GOTO 560 ELSE 410
[B2] 850 ' win
[23] 860 z=REMAIN(0)
[89] 870 MODE 0:POKE &A85F,1:FOR i=1
      TO 250:POKE &C000+(RND*&4000),12
      8:NEXT
[BD] 880 FOR f=18 TO 24:LOCATE 1,f:PE
      N 1:PRINT STRING$(20,143);:NEXT
[4C] 890 FOR i=1 TO 50:r=RND*16+2:s=R
      ND*14+2:CALL &8057,r,s,1:NEXT
[55] 900 LOCATE 6,23:PEN 3:PAPER 1:PR
      INT"THANK YOU!":CALL &A841:RESTOR
      E 1560:FOR j=1 TO 28:READ no,du:
      SOUND 1,no,du*10,15,2:NEXT
[18] 910 LOCATE 4,19:PRINT"ANOTHER GA
      ME?":LOCATE 6,20:PRINT i$"Y"i$"ES
      OR "i$"N"i$"O"
[9C] 920 IF INKEY(43)=0 THEN RUN ELSE
      IF INKEY(46)=0 THEN CLS:STOP EL
      SE 920
[AF] 930 ' dead
[20] 940 z=REMAIN(0)
[43] 950 IF nxt=0 THEN CALL &8057,h,v
      ,1
[94] 960 SOUND 1,20,0,1,1:SOUND 1,10,
      0,1,1,1
[0B] 970 IF me=0 THEN 990
[F9] 980 j=(x*32)-32:k=382-(y*16):FOR
      i=1 TO 250:PLOT j+(RND*20+5),k+
      (RND*20+5),RND*1+e:NEXT
[94] 990 SOUND 1,500,0,15,,1,1:CLS:FO
      R del=1 TO 2000:NEXT:GOTO 110
[6A] 1000 DI:IF me2>99 THEN LOCATE me
      ,3:PRINT op$;" ":me2=0:me=me-1:IF
      me=0 THEN RETURN
[5E] 1010 me2=me2+1:PLOT (me*32-32)+(
      RND*30),352+(RND*14),0:EI:RETURN
[96] 1020 IF rm=66 AND d=3 THEN FOR i
      =16 TO 23:LOCATE 11,i:PEN 1:PRIN
      T b$:NEXT
[0E] 1030 r=RND*1+1
[F5] 1040 IF d>2 THEN d=r:RETURN
[93] 1050 IF r=1 THEN d=4 ELSE d=3
[6D] 1060 RETURN
[96] 1070 ' place block
[72] 1080 CLS#1:PRINT#1,"  <FIRE> WHE
      N READY"
[E7] 1090 h3=h2:v3=v2:gs=1:pb=1
[0D] 1100 WHILE INKEY(fi)<>0:GOTO 560
      :WEND
[E5] 1110 CLS#1:PEN#1,1:PRINT#1," "i$
      "S"i$"NOWBALL OR ";:PEN#1,6:PRINT#
      1,i$"J"i$"ELLY?"
[F3] 1120 IF INKEY(60)=0 THEN b=1:GOT
      O 1130 ELSE IF INKEY(45)=0 THEN
      b=6:GOTO 1130 ELSE 1120
[3C] 1130 LOCATE h2,v2:PEN b:PRINT CH
      R$(242)
[6C] 1140 LOCATE h2,v2+1:IF b=1 THEN
      PRINT CHR$(243) ELSE PRINT b$
[10] 1150 h2=h3:v2=v3:gs=0:CLS#1:GOSU
      B 1250
[30] 1160 IF rm=60 THEN LOCATE 12,22:
      PEN 6:PRINT b$
[A0] 1170 pb2=1:GOTO 730
[9B] 1180 ' next room
[2D] 1190 SOUND 1,50,15,5,1,1:GOSUB 1
      250:GOSUB 1260
[CA] 1200 IF ga THEN ga=0:RETURN
[8C] 1210 IF rm=68 THEN rm=70:nxt=1:G
      OTO 560
[AE] 1220 x=1
[59] 1230 IF h=nr(x) AND v=nr(x+1) TH
      EN rm=nr(x+2):nxt=1:CLS#1:GOSUB
      1250:GOTO 560
[09] 1240 x=x+3:GOTO 1230
[ED] 1250 LOCATE #1,17,1:PEN#1,1:PRIN
      T #1,i$"Q"i$"UIT":RETURN
[45] 1260 CALL &8057,h,v,0:RETURN
[72] 1270 tr$=CHR$(22)+CHR$(1):op$=CH
      R$(22)+CHR$(0):i$=CHR$(24):b$=CH
      R$(143)
[EC] 1280 m$="MELTOMETER":DIM nr(15)
[F7] 1290 a=102:b=126:d=129:f=255
[5D] 1300 SYMBOL 242,0,24,60,b,b,b,f,
      f:SYMBOL 243,f,f,b,b,b,60,24,0
[99] 1310 SYMBOL 244,42,93,189,191,b,
      b,f,f:SYMBOL 245,b,b,b,60,24,0,0
      ,0
[73] 1320 SYMBOL 246,0,0,16,0,32,8,34
      ,f:SYMBOL 247,f,165,165,a,a,60,6
      0,a
[F8] 1330 SYMBOL 248,0,0,b,b,b,b,b,b:
      SYMBOL 249,b,b,b,b,b,b,0,0
[9B] 1340 SYMBOL 250,f,f,d,d,d,d,d,13
      3:SYMBOL 251,133,d,d,d,d,d,f,f
[C6] 1350 ENV 1,100,-2,2:ENT 1,50,5,1
      :ENV 2,15,-1,15
[73] 1360 RETURN
[AD] 1370 DATA -1,50,4,8,4,22,3,18,16
      ,51,0,17,14,17,18,10,20,10,22,10
      ,12,10,14,10,18,11,22,0,0
[40] 1380 DATA -1,51,3,17,2,17,3,13,9
      ,52,17,13,53,13,23,54,0,12,11,14
      ,15,12,15,12,19,16,15,12,21,0,0
[35] 1390 DATA -1,52,18,15,18,17,1,1,
      11,55,0,16,13,7,17,0,0
[0B] 1400 DATA -1,53,6,7,5,7,3,0,0,0
[E2] 1410 DATA -1,54,13,8,13,6,2,8,8,
      56,0,13,22,9,20,11,16,9,12,9,6,0
      ,0
[79] 1420 DATA -1,55,14,15,15,15,4,0,
      9,13,0,0
[BA] 1430 DATA -1,56,16,7,17,7,4,3,7,
      57,8,23,59,16,23,61,0,6,9,6,15,7
      ,21,4,9,17,15,11,9,11,15,11,21,0
      ,0
[BB] 1440 DATA -1,57,13,8,14,8,4,8,22
      ,58,0,0,7,8,0
[7E] 1450 DATA -1,58,9,19,9,17,2,0,7,
      9,0,9,23,6,21,0
[8D] 1460 DATA -1,59,11,8,11,6,2,6,18
      ,60,0,7,22,0,11,10,16,14,17,8,0
[13] 1470 DATA -1,60,17,8,18,8,4,8,16
      ,62,0,10,10,0,11,8,0
[3B] 1480 DATA -1,61,10,10,10,8,2,0,0
      ,10,22,0
[E5] 1490 DATA -1,62,17,16,18,16,4,6,
      10,63,0,5,12,4,16,7,12,5,14,0,0
[37] 1500 DATA -1,63,19,20,19,22,1,7,
      4,64,3,22,65,0,2,8,17,12,12,16,2
      ,20,12,12,15,12,16,12,17,4,19,4,
      13,8,0,3,12,10,10,5,17,19,17,16,
      18,17,24,4,22,9,16,0
[52] 1510 DATA -1,64,10,18,10,20,1,0,
      0,10,15,0
[94] 1520 DATA -1,65,2,7,2,5,2,1,9,58
      ,16,23,66,0,4,5,19,7,10,15,17,21
      ,18,19,6,7,3,21,0,0
[04] 1530 DATA -1,66,9,8,9,6,2,14,6,6
      7,0,0,9,24,14,22,13,5,0
[2E] 1540 DATA -1,67,3,9,2,9,3,20,15,
      50,16,19,68,0,2,11,9,17,14,13,0,
      0
[08] 1550 DATA -1,68,10,8,10,6,2,0,0,
      0
[FF] 1560 DATA 53,7,63,6,60,1.5,53,1.
      5,40,5,42,1,40,1,36,3,40,3,42,3,
      47,3,53,7
[21] 1570 DATA 42,1,40,1,36,3,40,3,42
      ,3,47,3,53,3,40,3,63,3,53,1,47,1
      ,53,3,60,3,63,3,71,3,80,7
```

```
[05] 1580 MODE 1:INK 0,0:INK 1,26:PEN
      1:PRINT CHR$(7);"Error in line";
     ERL:END
[E7] 1590 IF PEEK(250)=255 THEN RETUR
     N
[F4] 1600 INK 1,26:LOCATE 13,12:PRINT
     "PLEASE WAIT...."
[F2] 1610 MEMORY &7FFF:RESTORE 1720:l
     n=1720
[50] 1620 FOR adr=&8032 TO &847F STEP
      13
[21] 1630 READ byte$:chk=0
[4D] 1640 FOR i=0 TO 12
[B5] 1650 v=VAL("&"+MID$(byte$,i*2+1,2
     ))
[23] 1660 POKE adr+i,v:chk=chk+v
[0D] 1670 NEXT
[8C] 1680 IF chk<>VAL("&"+RIGHT$(byte$
     ,3)) THEN INK 1,26:PEN 1:PRINT"E
     RROR IN LINE";ln:STOP
[35] 1690 ln=ln+10:NEXT
[53] 1700 MODE 0:CALL &8032
[4B] 1710 POKE 250,255:RETURN
[99] 1720 DATA 2100c01150000619dd2100
     80dd3bc
[F5] 1730 DATA 7500dd7401dd23dd231910
     f321504
[4A] 1740 DATA 77811183a5012003edb0c9
     cd7e606
[38] 1750 DATA 800602c5d50608c5d5eda0
     eda06e4
[60] 1760 DATA eda0eda0d13e088257c110
     eed179a
[CC] 1770 DATA e521500019ebe1c110dfc9
     dd6e6ff
[CA] 1780 DATA 0026002929292929292911ac
     8019272
[35] 1790 DATA e5dd6e02dd5e04cd9a80d1
     ebc97dd
[6E] 1800 DATA 1d2dcb2526804e23466b26
     00cb3f3
[12] 1810 DATA 25cb2509c9000000000000
     00001e7
[CF] 1820 DATA 0000000000000000000000
     0000000
[D2] 1830 DATA 0000000000000000000000
     0000000
[D5] 1840 DATA 0000000000000000000000
     0000000
[D8] 1850 DATA 0000000000000000000000
     0000000
[F3] 1860 DATA 0000000000cccc8800cccc
     8800440
[18] 1870 DATA cccc8844cccccc44cccccc
     000c77c
```



```
[89] 1880 DATA 0c08040c0c0c048c0c8c04
     0c8c200
[2F] 1890 DATA 0c040c8c0c040c8c0c040c
     0c0c184
[32] 1900 DATA cc4ccc0ccccc0c0ccc8c0c
     080050c
[B7] 1910 DATA 0008000050000000f0a000
     50b02e8
[B8] 1920 DATA f000f03070a0f03070a0f0
     b0f07e0
[50] 1930 DATA a050f0f0000050a000b0b0
     3020570
[96] 1940 DATA 70303020b0b03020703030
     20b0440
[9B] 1950 DATA b030207030302 0b0b03020
     7030440
[D6] 1960 DATA 3020000000000000000000
     0000050
[25] 1970 DATA dd460011b3a5131ab820fb
     131a4b9
[8D] 1980 DATA feffc8fefe2008131a6713
     1a6f619
[A7] 1990 DATA 131a47131a32afa5e5cd75
     bb3e547
[A2] 2000 DATA 8fcd5abbe12410f318da32
     fe0469f
[4F] 2010 DATA 050e24132c0f25142dff33
     fe0231d
[6C] 2020 DATA 090f240f2c1025102dfe02
     0a0f202
[0D] 2030 DATA 24fe02170f24ff34fe0108
     13243df
[EE]-2040 DATA 0b2c0f25042d0425082dfe
     0a0920b
[A8] 2050 DATA 042cfe0a0f042cff37fe05
     080b3c3
[E3] 2060 DATA 240b2c0b250b2dff36fe08
     0506309
[CE] 2070 DATA 24132c0625132dfe0b060a
     2cff312
[7F] 2080 DATA 38fe0e110825062c022508
     2d01211
[AA] 2090 DATA 25092d0f24112c0a25fe07
     1208219
[32] 2100 DATA 24fe060b0c24fe060c0c24
     fe093aa
[23] 2110 DATA 180a24fe04180424fe0417
     04242c9
[1C] 2120 DATA ff39fe0f070825102c0224
     0d2d315
[86] 2130 DATA 0624032dff3afe08140c2d
     022530d
[C6] 2140 DATA 0f2c0424072d0225ff35fe
     04062fa
[B9] 2150 DATA 0c240f2c0d25102dfe0709
     0a2c21e
[16] 2160 DATA fe080d022cfe09090a2cfe
     0b09399
[EA] 2170 DATA 0a2cfe0d09062cfe0d1102
     2cff3c5
[FE] 2180 DATA 3bfe0a050224022c052409
     2c09203
[CE] 2190 DATA 25082c02250a2d0125032d
     0524136
[2E] 2200 DATA 062dfe0b0a0524fe0b0b05
     24fe3aa
[FC] 2210 DATA 080e0924fe080f0924ff3c
     fe093c7
[2C] 2220 DATA 050424022c0624032c0625
     0c2c117
[AE] 2230 DATA 0525042d0124022cfe0906
     012c1e8
[7A] 2240 DATA 0125082c0124022dfe0b08
     0c2c1f7
[FC] 2250 DATA ff3dfe090702240c2c0824
     052c305
[E0] 2260 DATA 1125052d07240c2dfe0316
     1024217
[EB] 2270 DATA ff3efe040a0c24052c0324
     032c300
[67] 2280 DATA 0f25082dfe050b0b24fe07
     0e082c1
[EC] 2290 DATA 24fe070f0824ff3ffe1103
     03243db
[50] 2300 DATA 162c1125fe0117132d1024
     fe04304
[33] 2310 DATA 080624092c0625072cfe04
     09071d7
[7E] 2320 DATA 24fe04100724fe020c0724
     fe02398
[6A] 2330 DATA 0d0724fe02050f24fe0b0a
     07242ae
[74] 2340 DATA fe0b0b0724fe06150a2405
     2d042bc
[C6] 2350 DATA 24fe06140924032dfe1111
     03242e0
[D2] 2360 DATA fe04181024fe1214042cfe
     02163b8
[2B] 2370 DATA 0224fe02170224ff40fe06
     0b073b8
[E1] 2380 DATA 240b2c07250b2dfe070f06
     24ff2fc
[C4] 2390 DATA 41fe01041324142c132514
     2dfe332
[74] 2400 DATA 02171224fe0305022cfe03
     0909296
[48] 2410 DATA 2c0c24052d0424fe04110b
     24fe2f6
[21] 2420 DATA 100e0324fe050e052d0f24
     fe062bf
[EE] 2430 DATA 0a0e24fe070d0424042cfe
     070e2b9
[45] 2440 DATA 0524fe0d0b042cfe111103
     24fe3b4
[8D] 2450 DATA 11120324ffdd5602dd7e00
     06023e1
[77] 2460 DATA f5cd90bbdd6606dd6e04e5
     cd757cc
[84] 2470 DATA bb7a3ccd5abb3c57e12ccd
     75bb6f0
[37] 2480 DATA 7acd5abbf13c10dec9cd14
     bc016de
[BC] 2490 DATA 0000afcd32bc010000cd38
     bc06432
[9D] 2500 DATA 10c578010000cd32bcc110
     f5c9598
[93] 2510 DATA 215fa8aff5464823e5cd32
     bce16fe
[A5] 2520 DATA f13cfe10280218ef3a5fa8
     474853c
[1D] 2530 DATA cd38bcc9011a1a001a0612
     0f06306
[1E] 2540 DATA 000f00181a000021050306
     12c5147
[70] 2550 DATA e5cd75bb06113e8fcd5abb
     10fb6b3
[80] 2560 DATA e12cc110edc90000000000
     0000394
```

Quick as a flash

Jeff Walker looks at the latest puppy to arrive in the Nemesis kennel

BONZO's Big Batch is a package which doesn't fit neatly into any of the conventional computer program pigeon holes, presented to us in a "what you see is what you get" fashion. And what you get is three programs – a database, a pools predictor, and a sprite/screen designer.

Data Manager is a simple database program that will hold a maximum of 500 records in memory at any one time. It is in two parts; the first, Initialisation and Amend, is where you set up the structure of your database.

There are only two field types to choose from, string and numeric, each of which can be up to 55 characters in length. You can have up to 20 fields in each record. Entering the details is simple and mistakes are easily rectified by the Amend File Structure option. There are also facilities to load an existing file structure, alter it to suit and save it as a new or amended structure.

There is, unfortunately, a small oversight in the routine that asks you for a filename. Any string of 12 characters can be entered – there is no check for the dot, illegal filename lengths, illegal extension lengths or illegal characters. If you have inadvertently typed in a bad filename, when you come to save the structure a very unfriendly *Error in line 1070* appears on the screen. Pressing a key gets you back to the main menu, but your file structure has gone.

Experienced Basic programmers will be able to check the routine around line 1070 and fix this bug themselves; novices will have to wait and pray that Nemesis fixes it for them.

Once your file structure is set up and saved to disc, the Data Manager program can be run. From the main menu you can load a file, add records, display the file to screen or printer, sort the file, search the file and save the file – the basic necessities of any database.

Searching the file entails creating a sub-file. For numeric fields there are four operators to choose from – equal to and greater than, less than, not equal to, equal to – and two for string fields – equal to, not equal to – after which you choose the field to search. There are no multi-field searches. This has to be done manually by creating sub-files of sub-files of sub-files...

When searching string fields you enter a key word, and all records containing that word in the chosen field are selected or unselected, depending on whether you chose = or <> as the operator. For instance, with the example file supplied on the disc, I chose to delete all records whose Title field did not contain the word "love". I ended up with the seven records shown in Figure I.

These details were printed out with the Report Writer facility. Here you can select what fields get printed in one of two styles – headings at the top or headings at the side. For Figure II, which shows the headings at the side style, I further deleted all records from my sub-file that were by The Beatles.

The program can also totalise fields, which means it could be used by a small business, to keep stock or transaction records for example. Also provided is a Utilities menu, which includes, among other things, facilities to catalogue discs and rename, but not erase, files.

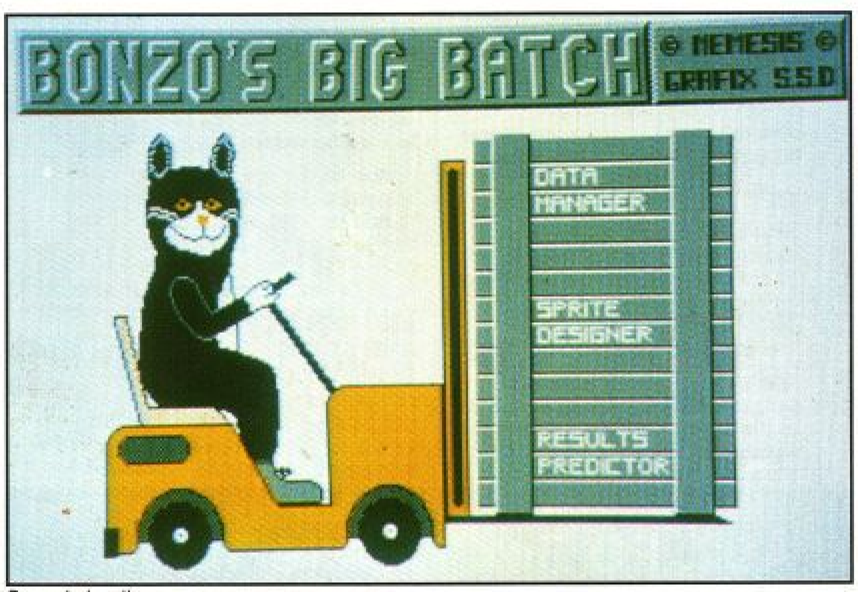
Data Manager is a very simple database program, it follows that it is easy to use. The supplied record collection file is one sort of database the program can easily handle, but it should also be ideal for storing things like the membership details of a small club to the client list of a travelling salesman.

Barbados here I come

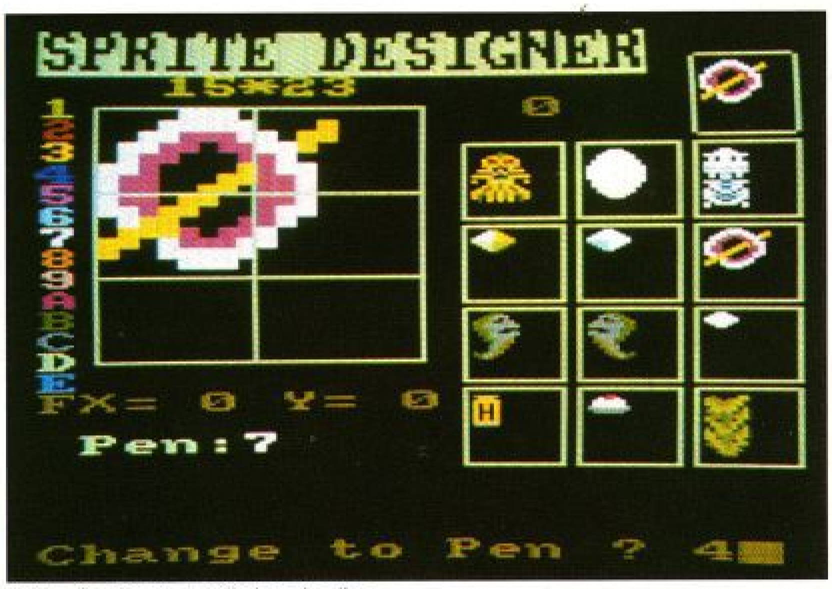
THE best known method for winning the jackpot on the treble chance is called the lucky numbers method. The very fact that people who do the same numbers every week seem to be the ones who hit the jackpot time after time is proof enough that studying the form of football teams

Rec No.	Artist	Date	Title
1	Beatles	62 10 11	Love me do
2	Beatles	63 08 29	She loves you
3	Beatles	67 07 12	All you need is love
4	ELO	79 04 19	Shine a little love
5	Soft Cell	81 08 01	Tainted love
6	Eurythmics	82 11 20	Love is a stranger
7	Thompson Twins	83 01 29	Love on your side

Figure I: A sub file of seven records, printed with headings at the top



Bonzo's loading screen



A file of sprites is supplied on the disc.

```
Record No: 1
-------------------------------------------
Artist              ELO
Date                79 04 19
Title               Shine a little love
Catalogue no.       Jet 144
High position       6
Weeks               10

Record No: 2
-------------------------------------------
Artist              Soft Cell
Date                81 08 01
Title               Tainted love
Catalogue no.       Some bizzarre BZS 2
High position       1
Weeks               16

Record No: 3
-------------------------------------------
Artist              Eurythmics
Date                82 11 20
Title               Love is a stranger
Catalogue no.       RCA DA 1
High position       54
Weeks               4

Record No: 4
-------------------------------------------
Artist              Thompson Twins
Date                83 01 29
Title               Love on your side
Catalogue no.       Arist 504
High position       9
Weeks               12
```

Figure II: A sub file of five records, printed with headings at the side.

is not only a waste of time, but is actually counter-productive.

What then are we to make of a program that studies football form and predicts homes, aways and draws?

Like all football pools forecasters, Pools Predictor claims that its predictions consistently outperform chance. Now the fact is that if you pick a number of matches at random to be homes, about 49 per cent will result in wins for the home team. Similarly, if you pick a number of matches at random to be Aways, around 26 per cent will be correct predictions. For draws – score and no-score collectively – the figure is 25 per cent.

These are the scientific "chance" figures, so outperforming chance, it would seem, does not actually get us anywhere near the 80 per cent reliability needed for a jackpot on the Treble Chance every week. Despite these facts, football pools forecasters still sell.

Pools Predictor is easy to use. The season is set up by an initialisation program, where you enter the names of each team in each league. Up to nine leagues can be entered, specifying whether each plays the Scottish system, where each team in the division plays another team in the division more than once at home, or the English system, where each team plays another only once at home.

In the main program you enter fixtures effortlessly by moving a pointer down a list and clicking on the home team, then the away team. Joystick or cursor keys can be used. Results are entered in a similar manner, using a smiley icon to point at the teams and then the number of goals scored for each team.

The goals scored menu only goes up to nine, so if a team scores 10 or more – which is rare but possible – nine is all you can give them. This almost certainly doesn't affect forecasts significantly enough to upset a prediction, but it messes up Pools Predictor's other function as a football database.

Forecasts are given fairly quickly, match by match, division by division, with a home, away and overall rating. Example output is shown in Figure III. This is followed by a summary of predicted homes, draws, aways and overall ratings.

I tried it for four weeks. It predicted 64 Homes and got 26 correct, which is 40.62 per cent, a little below chance; it predicted 82 draws and got 20 correct, which is 24.39 per cent and about the same as chance; it predicted 64 aways and got 24 correct, which is 37.5 per cent and well above chance.

Over the four weeks then, taking every predicition into account, Pools Predictor did slightly better than chance.

From the scientific gambler's point of view, however, football pools are a mug's game. But they're fun, and so is Pools Predictor.

Sprite and screen designers are typically only useful if you are a machine code programmer. This program is no exception, but it is a very good example of its breed.

Sprite Designer lets you design up to 36 sprites in Mode 0 – maximum size 16 x 24 pixels – and save them in one file. There are copious commands for manipulating the sprites – you can mirror, rotate, scroll, insert lines – and plenty of housekeeping commands for changing colours, storing, copying and saving your masterpieces.

Once saved you can run Screen Designer, load a sprite file and start splodging sprites here and there to create Cybernoid clones and Last Ninja lookalikes. Up to 25 sprites can be placed on a screen and up to 60 screens can be stored in memory at any one time.

You can do a wholesale replace of one sprite with another, combine any number of the 60 screens together, copy screens, stretch and shrink sprites to fit spaces.

Screen Designer is easy to use and fun to play with. An hour's hard work got me a few screens that looked fairly professional. You know the sort of thing – rocks and pipes and gun emplacements and things. Nothing to write home about, but then I'm no Nick Bruty.

Sprite files can be loaded and saved at will. Screen addresses of the sprites are provided when asked for. A group of finished screens can be saved to disc in their compacted form, or separate screens can be saved as normal 17k screen images, which can be loaded again later for further editing.

Great fun, but not much use unless you know how to manipulate the screen data from machine code. The Big Batch manual is no help here at all, but then this sort of tuition would need a full scale book. Sprite and Screen Designer, therefore, is a specialised tool for the machine code programmer who knows what he is doing.

The verdict

The best use anyone could make of Bonzo's Big Batch is to study the Basic listings to learn how to write commercial quality software in Flash Basic. If you write something that's up to scratch, Nemesis may even be interested in marketing it for you.

This disc shows off just how powerful Flash Basic is, and you don't even have to own Flash Basic to run it. Recommended for the inquisitive Basic Programmer.

Bonzo's Big Batch costs £12.50 (disc only) and is available from Nemesis, 10 Carlow Road, Ringstead, Kettering, Northants. NN14 4DW. Tel: 0933 623967.

```
Scottish Premier

Dundee United v Hearts      74   18   155 H
Hibernian v Celtic          70   12   158 H
Motherwell v Aberdeen       7    77   29  A
Rangers v Dundee            92   37   154 H
St. Mirren v Hamilton       63   24   139 H
```

Figure III: Example output from Pools Predictor. Hibs, who won, were the top home selected that week; aberdeen, who drew, were the top away selection

Inch high technology



Phil Craven gets into the driving seat for a spin around Siren's 80 tracks

AS computer technology has developed over the years, becoming smaller in its old age, so the floppy disc has followed suit. The 8in disc quickly gave way to the 5.25in disc, and drives were reduced to a fraction of their original bulk. While 5.25in drives were losing height and 8in discs were seeking work as frizbees, two smaller floppies were introduced – the 3in, with which we are all very familiar, and the 3.5in.

The main difference between the two, as far as we CPC users are concerned, is that our drive mechanism is 40 track single-sided, so we have to turn the discs over to use both sides, whereas the 3.5in is 80 track double-sided – 80 tracks per side, and the disc never needs turning over.

There are two inherent problems with 5.25in discs. The first is the floppiness of the disc's sleeve, the second is the large hole in the sleeve through which the read and write heads access the disc; it is never closed, so the disc is always open to dust.

Yet even today, new and expensive computers come on to the market with built-in 5.25in drives. We could be tempted to think that the 5.25in is the better device, but they are only there because the older computers had them, and because a lot of software already exists on 5.25in discs.

Where the 5.25in option really scores is in disc prices. Top quality 5.25in discs cost about the same as 3.5in discs, but regular quality 5.25in discs can be bought for as little as 30p each in quantities of 50 or 100.

On the right tracks

While both sides of the 3.5in disc are used for data storage, there is only one directory, so to the user it appears as though only one side of the disc is used.

The more tracks there are on a disc, the more data it is able to store; an 80 track disc will store twice as much data as a 40 track disc. Normal 80 track formatting will give 800k of disc storage space, but most disc drives will step a few tracks more than normal. Siren boss Simon Cobb says he is happy for his drive to format up to 84 tracks, giving 880k.

Due to the use of ultra-modern surface mount technology, the Siren 3.5in drive is only an inch high. The unit measures 4in x 6in x 1.25in and sits perfectly on top of the internal 664 or 6128 drive. A power supply and a drive cable for the 464, 664 or 6128 are supplied.

This all sounds pretty good stuff, but the more observant will have noticed that I referred to "normal 80 track formatting" – and we don't have 80 track formatting on the CPC, normal or otherwise. Since the CPC's drives are 40 track mechanisms, the software we have for formatting discs – CP/M Plus Disckit3, for example – will only format 40 tracks, even on an 80 track drive.

Some commercial disc utilities will format 80 tracks, but Amsdos will only recognise 40 of them and continue to give 178k per side. To get the full capacity out of Siren's 3.5in drive another disc operating system is needed. CP/M won't really do, since most commercial programs run under Amsdos.

Siren offers a choice of Rodos or Ramdos to accompany its drive. They are both excellent operating systems which make full use of the drive. Rodos comes on rom, with Ramdos on disc or rom (the rom version is called Romdos).

In use, each system is invisible to the user – SAVE, LOAD and CAT operate normally whether the 3.5in disc Amsdos format or the new system's format.

CP/M users should note that whereas Romantic Robot's Rodos has some excellent features, CP/M compatibility is not one of them. KDS's Ramdos, on the other hand, includes Ramdos2 and Ramdos+ for use with CP/M.

The Siren drive is designed and configured as drive B, but by changing the position of its drive select switch it will operate as drive A on a 464. However, the CPC disc interface DDI-1 will still be needed by 464 owners and, since all CPC disc software is on 3in disc, it would seem pointless to use the 3.5in as drive A.

With up to 880k of storage space and only one directory, the usual 64 directory entries would not be enough. Both Rodos and Ramdos overcome this by allowing a selectable number of directory entries, such as 128 or 256.

I haven't mentioned the make of the drive. This is because Siren will supply either the NEC or the Mitsubishi mechanism, depending on which is in stock at the time.

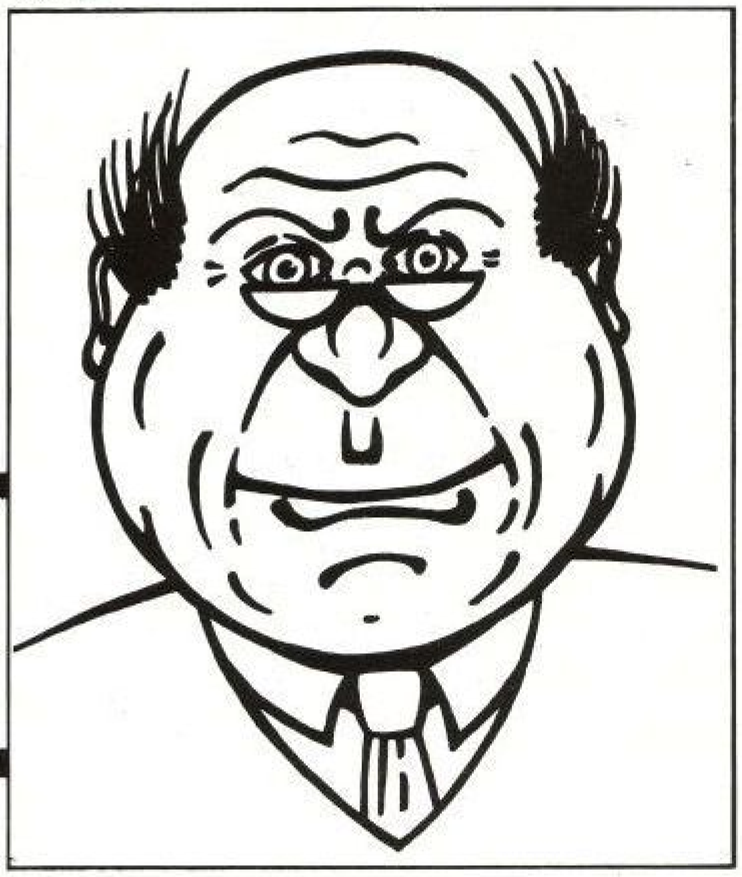
The drive is described as one megabyte, which would imply that it has 1024k of storage capacity. But that is its unformatted storage capacity. Whether or not 1024k is realised depends upon the constraints of the system's hardware and software. In our case we can only get 800k on 80 tracks, which is done by increasing the number of sectors per track from the usual nine sectors to 10. Most computers never realise 1024k on a 1Mb drive after formatting.

In conclusion then, you need to ask yourself two questions: Will I be using a large quantity of 3.5in discs? If so, will the saving on 5.25in discs more than make up for the higher cost of a 5.25in drive?

This 3.5in drive is the first to be sold specifically for the CPC. To be honest, until I saw and tried it I wasn't at all bothered whether one was available or not. I was perfectly happy with my 5.25in for backups and archives. But this little cutie has stolen my heart.

The 3.5in drive featured in this article costs £110.00 on its own, £124.99 with Ramdos (disc), £134.99 with Rodos (rom) or Romdos (rom). It is available from Siren Software, 2-4 Oxford Road, Manchester, M1 5QA. (Tel: 061-228 1831).

Applications advice

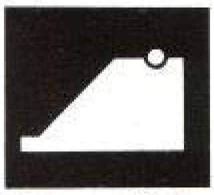


David Foster limps into action with a sick computer

I PROMISED last month to come up with some patches for Entrepreneur and Decision Maker. I had a look at Entrepreneur, and as far as I can tell nothing extra is needed to make this program work with an Epson-compatible printer, but I have not yet had an opportunity to check it fully.

I also had a quick look at Decision Maker before my CPC decided to go on strike, and it is obvious that some changes are needed to make it print correctly. I am hoping to have my computer repaired in time to sort out a solution for next month.

Rodos and Promerge Plus



John Burgess of Thame uses Arnor's (0733 68909) Protext and Promerge Plus together with the Protext Office program, and finds them ideal for his needs – with one exception. When he tries to use Rodos, which among other things allows him to use a variety of different sized discs and a different filename structure, he finds that his CPC crashes if he uses Promerge Plus as well.

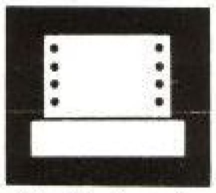
He has been told by Romantic Robot (01-200 8870), the company which markets Rodos, that both programs use illegal memory and cannot be used together. I assume that by illegal memory they really mean undocumented calls to memory.

Changing the way the disc operating system works is a radical alteration. It is not really surprising that some programs will not work with Rodos. Promerge Plus intercepts a number of system calls, following the officially documented procedures for doing this. I think this is borne out by the fact that, with few exceptions, it will work correctly with other programs.

I can only assume that Rodos also redirects some of these calls to change the way that the disc operating system works, and this is what causes the problem.

I suspect the answer is that Rodos and Promerge Plus cannot be used together. I will investigate further and return. . .

KDS Port Mk2



The Mk 1 version of the KDS 8 bit printer port was incompatible with CP/M, and some programs would not work properly when the port was connected, even if it was not initialised. The Mk 2 version sets out to solve these problems.

It consists of a very neat printed circuit board, about 4cm square, containing two chips, two capacitors and a resistor. In addition it has an edge connector providing a new output for the printer.

Installation is simplicity itself – just a matter of pushing the interface firmly on to the CPC's printer port. In the process most of the interface neatly disappears inside the CPC's case, leaving the new connector sticking out about 1.5cm further than the original.

No software is supplied. The programs needed to initialise it are very short – three single sided A4 sheets of instructions are provided, which include the required program listings.

For use under Amsdos the program consists of only five or six lines of Basic. They can be typed in and saved as a separate program, or can be incorporated into the Basic loaders used by many programs so that the port is automatically initialised when the software is run.

Another procedure is needed for use under CP/M, and this differs for CP/M 2.2 and CP/M Plus. In both cases the procedure modifies the CP/M program file so that when the operating system is loaded, the port is automatically initialised.

Note that it is important that the modifications are only carried out on a copy of the CP/M system discs, not on the originals.

The CP/M 2.2 modification consists of a 40 line Basic program run from Amsdos. It prompts you to insert the system disc and carries out the needed modifications. With CP/M Plus you have to make use of the SID program supplied on one of the system discs. In both cases the programs and instructions are clearly printed and described.

This Mk 2 version answers the criticisms of the earlier version – it does not mess up printing in programs that do not make use of it as long as it has not been initialised. If you make the small amount of effort needed to set your programs up so that the port is automatically initialised, you can largely forget about it and just benefit from the features it provides.

A number of programs will work with the normal printer port, and have the option to make full use of an 8 bit port if available. One such is Qualitas Plus from Seven Stars Publishing (06284

3445), which provides two complete sets of fonts.

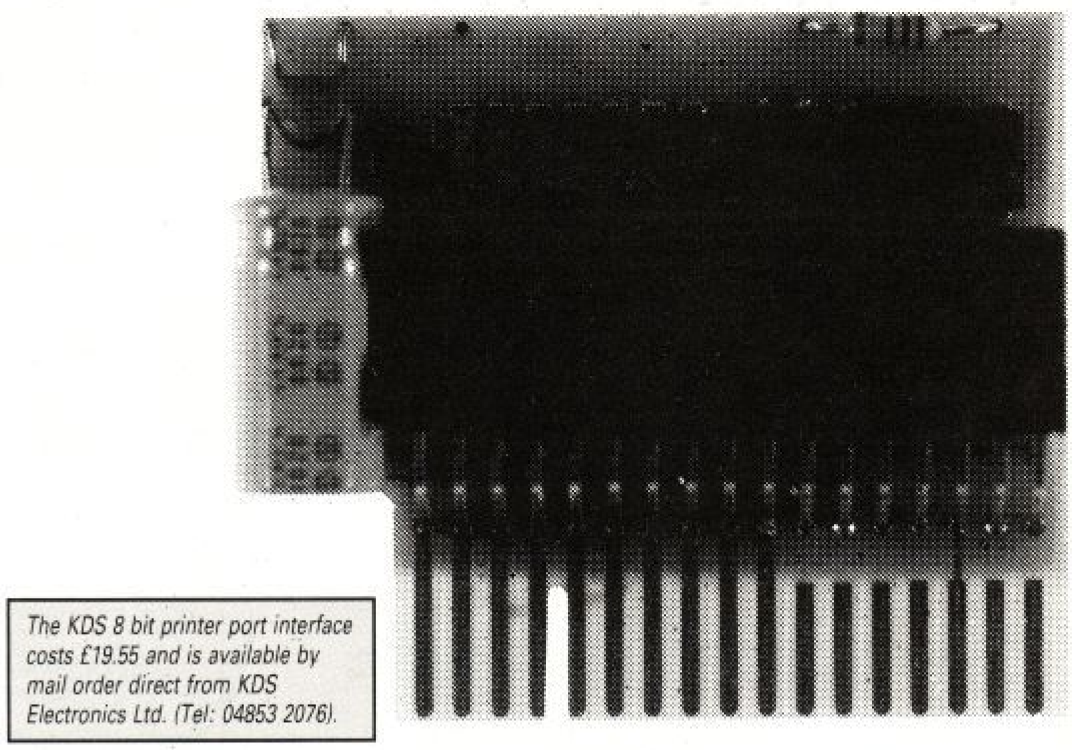
The font for use with the standard port provides good character shapes within the limitations imposed, but it is not possible to have true descenders, and underlining tends to be pushed hard up to the bottom of the letters. The Qualitas Plus 8 bit fonts provide improved character shapes and better underlining.

Another program making use of the interface comes from KDS Electronics. Called Screen Master and described as a poster and document creator, it can be configured for use with or without an 8 bit port.

I was able to to define my own characters using either the CPC or CP/M Plus versions of Protext, making full use of my printer's facilities for the first time. The port will work equally well with any other program that allows you to redefine characters. Using the interface it is possible to print any character that can be defined within the matrix permitted by your printer.

The port also allows you to access any character that your printer is capable of printing just by sending the appropriate Ascii value. This can be done from your own Basic programs or, in many cases, from within other programs. If your printer has an IBM mode you will be able to use all the extra accented characters and line drawing characters.

If you have ever felt restricted by the limitations of the 7 bit port, or you have software that would benefit from it, then the KDS 8 bit printer port interface will solve your problems.



The KDS 8 bit printer port interface costs £19.55 and is available by mail order direct from KDS Electronics Ltd. (Tel: 04853 2076).

Big buffer time



Mick Ball of Chelmsford wants to increase the size of his expansion token buffer so that when he loads Protext using a Basic loader – he has the rom version – it will automatically configure a number of his keys.

This is easily done by incorporating the routine below at the start of the Basic loader. It has the effect of reducing HIMEM by the size of the buffer and creating a new buffer at that location. Afterwards, when Protext loads, this buffer will still be present and protected from being overwritten.

Mick also wants to know whether it is possible to put his Protext loader program on rom so that it can be called from rom, and in turn load Protext.

Yes, it is possible, though I doubt whether it is worth the effort unless you have a considerable number of routines you want to incorporate into the same rom – in which case you could add the loader as well.

Bill Gray uses Masterfile III from Campbell Systems (0378 77762) and finds the small increase in buffer size provided by that program is insufficient.

The easiest way to increase it is to load the Masterfile III loader program – DISC.BAS – and insert the lines in the routine below at the start of the program, having first renumbered the existing line 5 to line 1. Line 30 then requires editing to remove the *CALL &8027:* from the middle of it.

Save the modified program and run it. All the new definitions can be added from line 150 onwards, where indicated in the loader program.

```
2 buffsize=400 'set to size required.
3 MEMORY HIMEM-buffsize-16:codeaddr=H
  IMEM+1:buffaddr=codeaddr+16
4 FOR offset=0 TO 15:READ dat:POKE co
  deaddr+offset,dat:NEXT
5 CALL codeaddr,buffaddr,buffsize
6 DATA &dd,&6e,&00,&dd,&66,&01,&dd,&5
  e,&02,&dd,&56,&03,&cd,&15,&bb,&c9
```

Routine to increase the size of the expansion token buffer. Change the value of "buffsize" in line 2 to the size required

CPC auto-boot



William Urquhart from Perth poses the question about whether there is any way, either by hardware or software, to make his 6128 auto-boot, so that when first switched on it automatically runs a program to carry out tasks such as re-defining certain keys for word processing or programming purposes.

Yes, it is possible, although not totally straightforward. There are probably several ways it could be done, but the method I used involved using a rom board after writing and programming a rom.

I made use of the fact that when the CPC is switched on it initialises all background roms. This initialisation procedure allows you to write routines to be executed during the initialisation process, a trick often used by rom software companies to print copyright messages on screen, but there is no reason why other routines cannot be used.

Alternatively, a foreground rom could be written to carry out the process. Rom socket 0 can only be used with a foreground rom, and this is where Basic normally maps itself. But if a foreground rom is inserted in a rom board's socket 0, the computer will load straight into this rom instead of Basic, which will locate itself in the first available rom select number.

Of tapes and type-ins



Enter Ernie Davies of Pontypridd, has written in with two problems, the first of which concerns the program listing for Spring on a Thing in our November issue. When he runs it he gets the message *Improper argument in line 1580.* The contents of that line are *POKE n,a3.*

Here we have one of those occasions when the error message does not directly relate to the line causing the problem – this part of the program is reading data from a two DATA statements. Ernie will find that somewhere in his DATA lines, 1610 or 1620, there is a mistake.

The most common error is to use either a capital letter O instead of a zero, or a full stop between the numbers instead of a comma. The reason for the message indicating that the error is at line 1580 is that when the line is interpreted, the variable *a3* contains an invalid value read from the data.

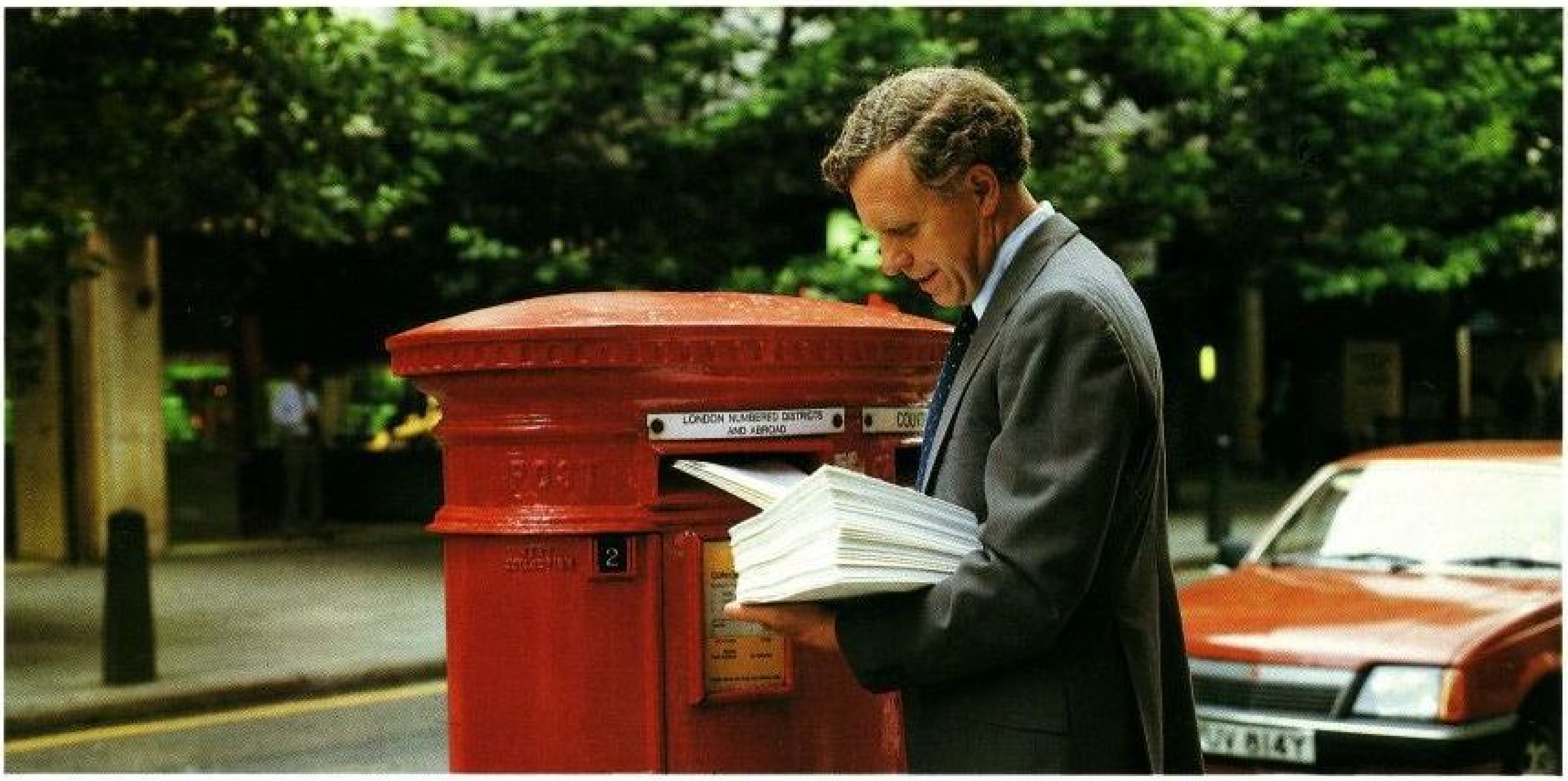
Ernie's second problem is that he has bought a tape recorder for his 6128 so he can load tape based programs. So far he has been unable to load anything.

A few tape-based programs will not work on the 6128, but this is only true of early ones written before disc drives were available. Having first typed ❘TAPE, you should find that all recent programs will load OK.

Some tape recorders, seem better than others. Experimentation may be needed with the volume setting to get satisfactory results. Once the correct level is found, mark it.

Occasionally the head alignment of a recorder is not sufficiently aligned for it to work properly. This can be cured by adjusting the alignment, either by a getting a repair company to do it, or by doing it yourself with any of the CPC head alignment programs on the market.

The day Roger Jackson sent his first mailshot.



I was impressed by the fact that Star have now produced a great looking little budget printer with a 24 pin head.

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I was impressed by the extremely swift draft elite speed of 170cps and LQ elite at 57cps and the standard 7k buffer.

I was impressed by the special push-tractor feature that allows the LC24-10 the lowest possible tear off and its ability to 'park' continuous paper and load single sheets automatically – so there's no need to remove the continuous.

I was impressed by the touch-button front control panel that makes using the printer an absolute dream.

But most of all, I was particulary impressed with myself.

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Please tell me how the Star LC24-10 can handle my printing needs.

Name ____________________

Company ____________________

Address ____________________

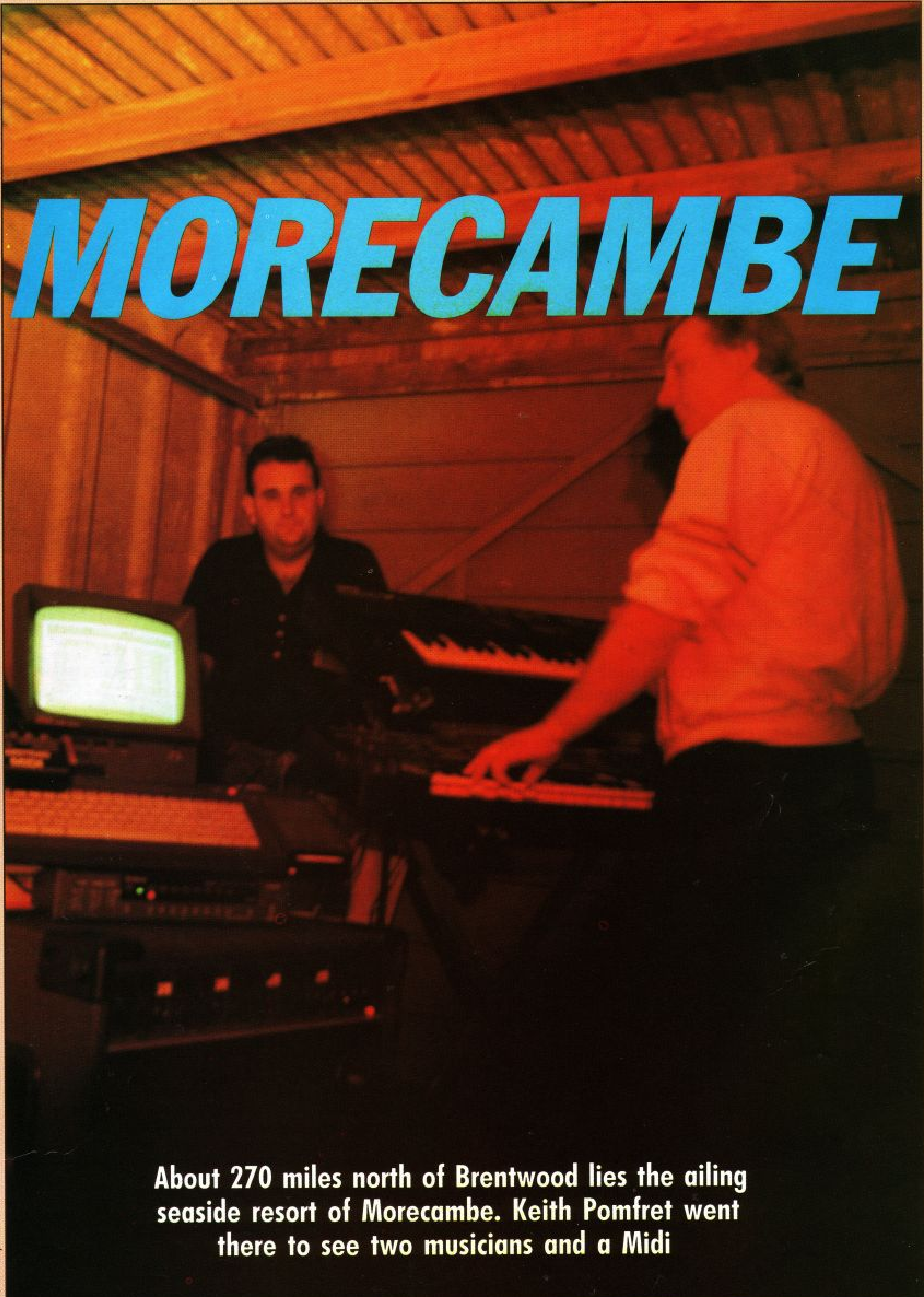
____

Postcode ____________ Telephone ____________

Or just call Belinda on 01-840 1829.

L24ACU2

MORECAMBE R



About 270 miles north of Brentwood lies the ailing seaside resort of Morecambe. Keith Pomfret went there to see two musicians and a Midi

Photo: Tanya Al-Rais

ROCK

WHEN one American and three Japanese companies agreed on the international Midi standard they broke new ground in the compatibility conspiracy which has plagued the computer industry since the invention of the analytical engine.

Midi, or Musical Instrument Digital Interface to give it its full title, is a set of defined rules which allow suitably equipped instruments – like drum machines, modules, sequencers and computers – to communicate with each other.

To the musician, Midi means he can play more than one instrument at a time, control his entire performance from one module.

A little over a year ago Dave Wright, who works for the CEGB, and Martin Fleming, a builder, were part of a semi-professional five piece cabaret band playing to mixed audiences around the west Lancashire and Cumbrian coastline. Dave bought a 464 for the kids. He took little interest in it, happy to watch his five-year-old mastering Chuckie Egg. Then a work colleague played him the audio demo that comes with the CPC Midi-track Performer from EMR.

Dave leapt into action. Within a week he replaced three of the band – the bass guitarist, rhythm guitarist and drummer – with the Midi-track Performer and an 8 track sequencer from DHCP.

Loading song files from tape wasn't quick enough for a live performance though, so he upgraded to a 6128. But at a time when the media is pointing at the 16 bit computer as the machine for the professional person, isn't it a little unusual for pro-musicians to be using what is considered a home computer?

"Not at all", said Dave, "we have to work within a limited budget. As well as the initial outlay, remember that the rigours of stage life could cause any piece of our equipment to need instant replacement. If the 6128 goes down, it's easy to replace. It doesn't break the bank".

That wasn't the only reason Dave stuck with the CPC. "The 178k drives are just the right size to put all the songs from one set on", he explained, "so there is no need to change discs on stage – just the flick of the joystick to load a song".

And what of the music? Is *that* any better? "A vast improvement", said guitarist Martin, winking an apology to Dave. "With the computer driving four keyboards and a percussion section, it gives us the kind of consistency and quality you hear on Top of the Pops. This leaves me free to concentrate on singing and playing the guitar, while Dave orchestrates it all from behind his banks of keyboards".

The Business, as the lads call themselves, keep libraries of songs on different discs for the different audiences that they have to play to, thus varying the content of their shows and allowing them the flexibility they need with the constantly changing musical climate.

DHCP Midi

This is the easiest Midi software and interface set to drive. No bells or whistles – or icons for that matter.

The display is simple to read, self-explanatory and clear to look at. As a lover of icons I was a little disappointed at the lack of them, but after using the sequencer I am converted. An 8 track recording studio is a reasonable description.

Eight separate tracks, each working in real time – what you plays is what you hears – with the ability to quantify notes, which means to put them right if you play out of time.

Each track can be looped to save repetition and, as you record, an indicator decrements from 100 per cent to zero. A metronome, which sounds like that infuriating handclap on Hooked On Classics, is there to help you stay in time.

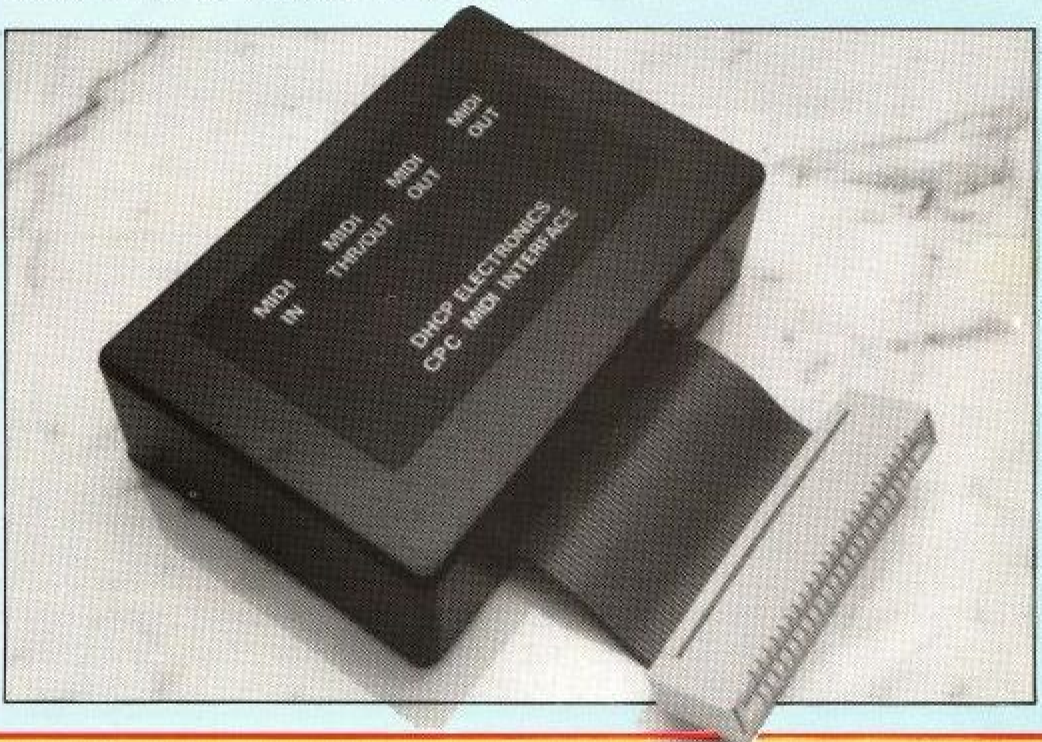
The software will save program or patch changes. There is a notepad, useful for remembering which track is bass, piano, drums and so on. All Midi channels are accessible from individual tracks and velocity – how hard you thump the keys – is stored if your keyboard can send the data for it.

The first time I had to refer to the manual was when charged with the task of reviewing it, and then only to check if there were any more features lurking.

If you are a Music Machine owner and you are wishing that you'd waited for this 8 track polyphonic package, there's some good news for you. DHCP do the sequencer configured for the Music Machine as well.

For references on DHCP Electronics, apply to Jean-Michel Jarre – it was David Hickford at DHCP who did the software for the Laser-harp at the Docklands concert.

The DHCP Midi interface and 8 track sequencer software (on disc) costs £104.90. The software alone, configured for the Music Machine if required, costs £34.95 on disc. Available from DHCP Electronics, 32 Boyton Close, Haverhill, Suffolk, CB9 0DZ. (Tel 0440 61207).



"We did consider using taped backing tracks", said Dave, "but they always give themselves away by the hiss. Besides", he laughed, "imagine holding up the encore while you found the right spot on the tape. The 6128 has the capability to do all we want. With the Miditrack Performer out on the road, the DHCP 8 track sequencer for studio work and experimental music, we feel we have a format that will see us well into the future".

The audience is the best judge of a group's success, so I followed the lads to a couple of gigs – one in a night club and the other in a small social club.

Night club manager Peter Galloway was very wary the first time he booked The Business. "These two guys turned up with the same computer my nipper uses to kill aliens", he said. "But they sounded good – better than some five piece bands – and that eerie green glow from the monitor is an absolute people magnet." He gave Dave and Martin a regular booking.

In the social club the story was the same – fear of the unknown followed by incredulity at the quality.

The audiences like it, too. Gone is the symphony of feedback that normally heralds live music, and in its place is the compact disc quality of digitally driven music with live, atmospheric overlays.

While I was chatting to the boys, a young lady called Tracey arrived at the house. "The latest project", beamed Dave.

It seems that there is no end to the versatility of Midi on the 6128. Tracey is a trained singer who has been resting for couple of years. On deciding to return to the public eye she approached Dave and Martin for some support. She had entered a

talent contest but was unwilling to put her comeback in the hands of the house organist, who plays everything at a foxtrot.

After deciding on three songs, Tracey now practices knowing that the music she is becoming familiar with is exactly what she will sing to on the day of the contest.

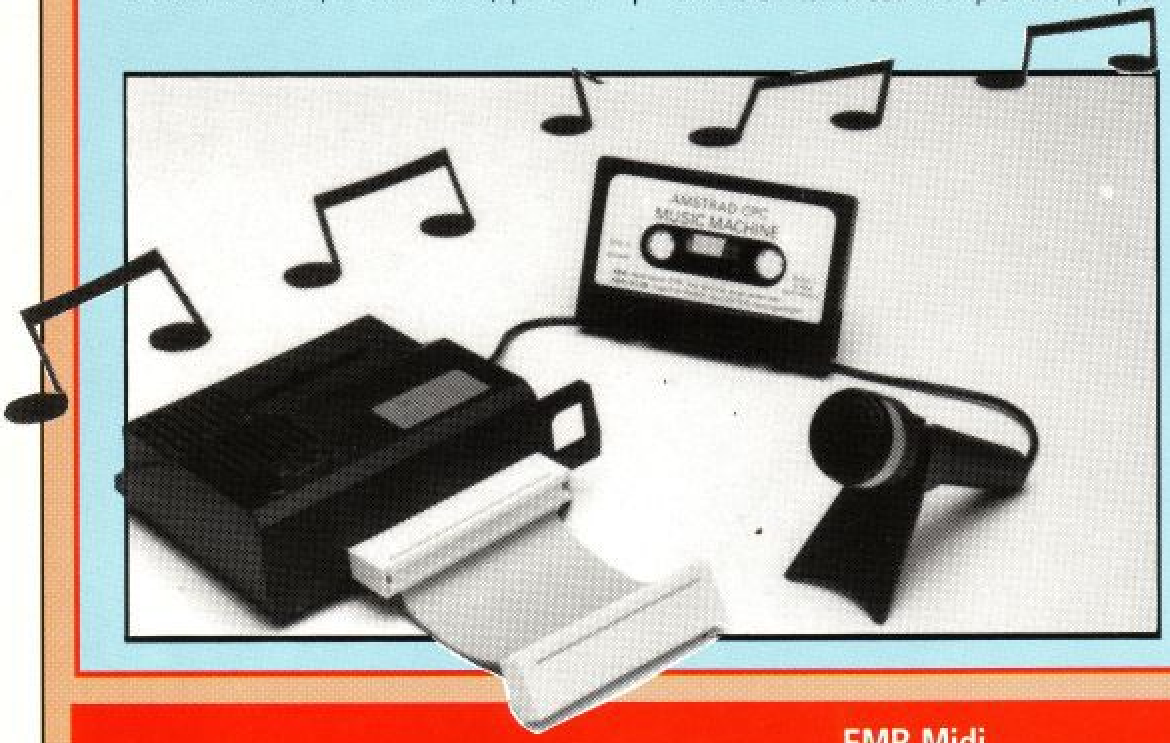
Soon The Business will be going into the studio to record some of Dave's own compositions. With studio time at up to £200 an hour, the DHCP sequencer comes into its own, allowing Dave and Martin to do all the building work at home in the garage before taking a finished product to the studio, awaiting only production.

The last word for Martin: "Music is a service industry", he says. "The EMR and DHCP Midi software and interfaces have increased tenfold our ability to give that service".

RAM Midi

The Music Machine from Ram Electronics comes in a big box with a 36 page manual, interface, software, ribbon cable, headphones and microphone. It doesn't know whether it's a drum machine, sound editor, personal stereo, digital sampler or pre amp.

The software takes you through various menus, which are accessed via single key-press. The sequencing part can be used to drive the internal sound chip or the comprehensive on-board drum machine, but not both together.



If you have a Midi instrument attached, the drums and sequencer can be used together. The drum sounds are digitally sampled and as such are real drum sounds.

I was a little doubtful as to whether the Music Machine would be of any use in a live music environment, but when testing it in the studio I found that it makes a good live drum machine. The drums can be played off a standard Midi keyboard – a useful feature.

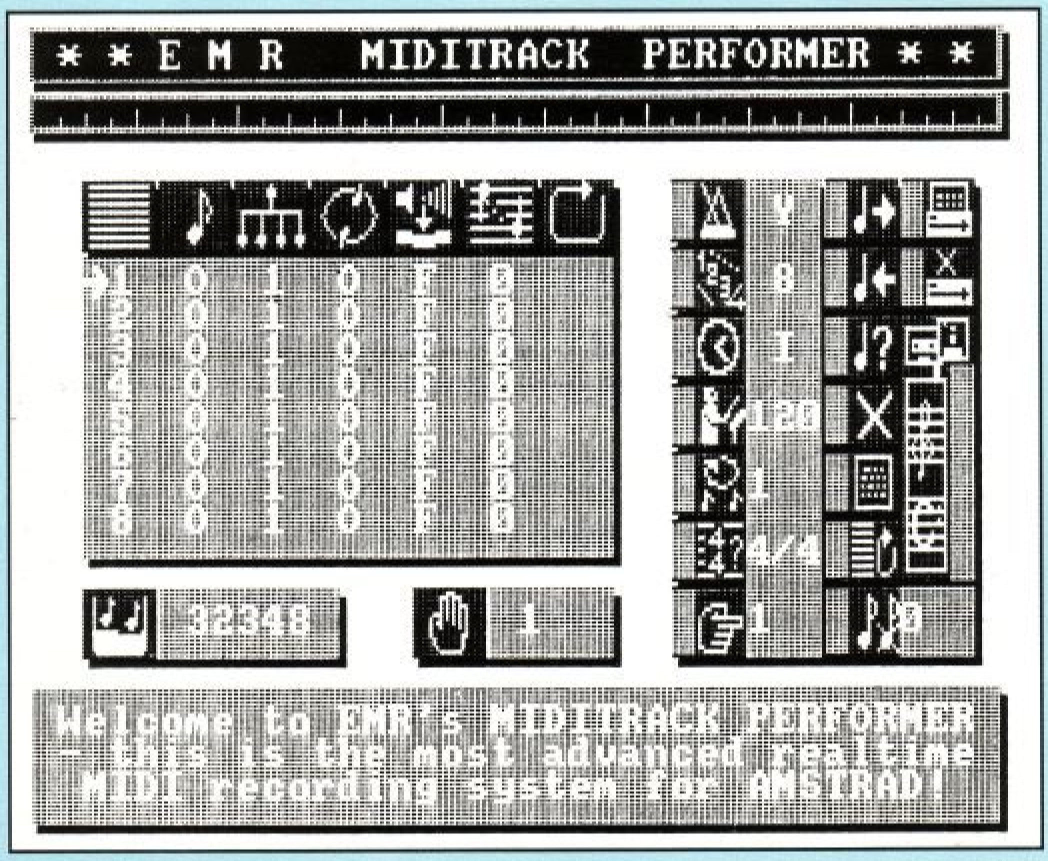
The Music Machine is a set-up for the hobbyist, a sentiment echoed by Ram Electronics' boss Martin Shoebridge, who sees it as "...a home and domestic studio package offering a good many of the features found in a professional studio, but at a fraction of the price".

The Music Machine costs £49.95 (tape), £59.95 (disc). From Ram Electronics (Fleet) Ltd, Unit 16, Redfields Industrial Park, Redfield Lane, Church Crookham, Hampshire, GU13 0RE. (Tel 0252 850085).

EMR Midi

ElectroMusic Research produce the Miditrack Performer and interface for many different computers. The CPC version is one of the best – a black box with Midi I/O ports and a plastic book-shaped folder with the software enclosed on both cassette and disc.

Miditrack presents you with a single screen to work from. A delve into the comprehensive instruction book explained the icons, and after taking the choice to use a joystick rather than the cursor keys I soon learned the meaning of them.



No expense has been spared to squeeze every conceivable bell and whistle into the 8 track sequencer software. It operates like a multi-track studio tape recorder, only sending control data instead of actual music. This means you can record in real time, quantify notes, loop tracks, and do all the things that you can do in a professional recording studio.

When you record, the control data – such as aftertouch and velocity – can take a lot of valuable recording space, so if you are recording, say, an organ sound, which isn't touch sensitive, you can switch off the performance controls and save memory.

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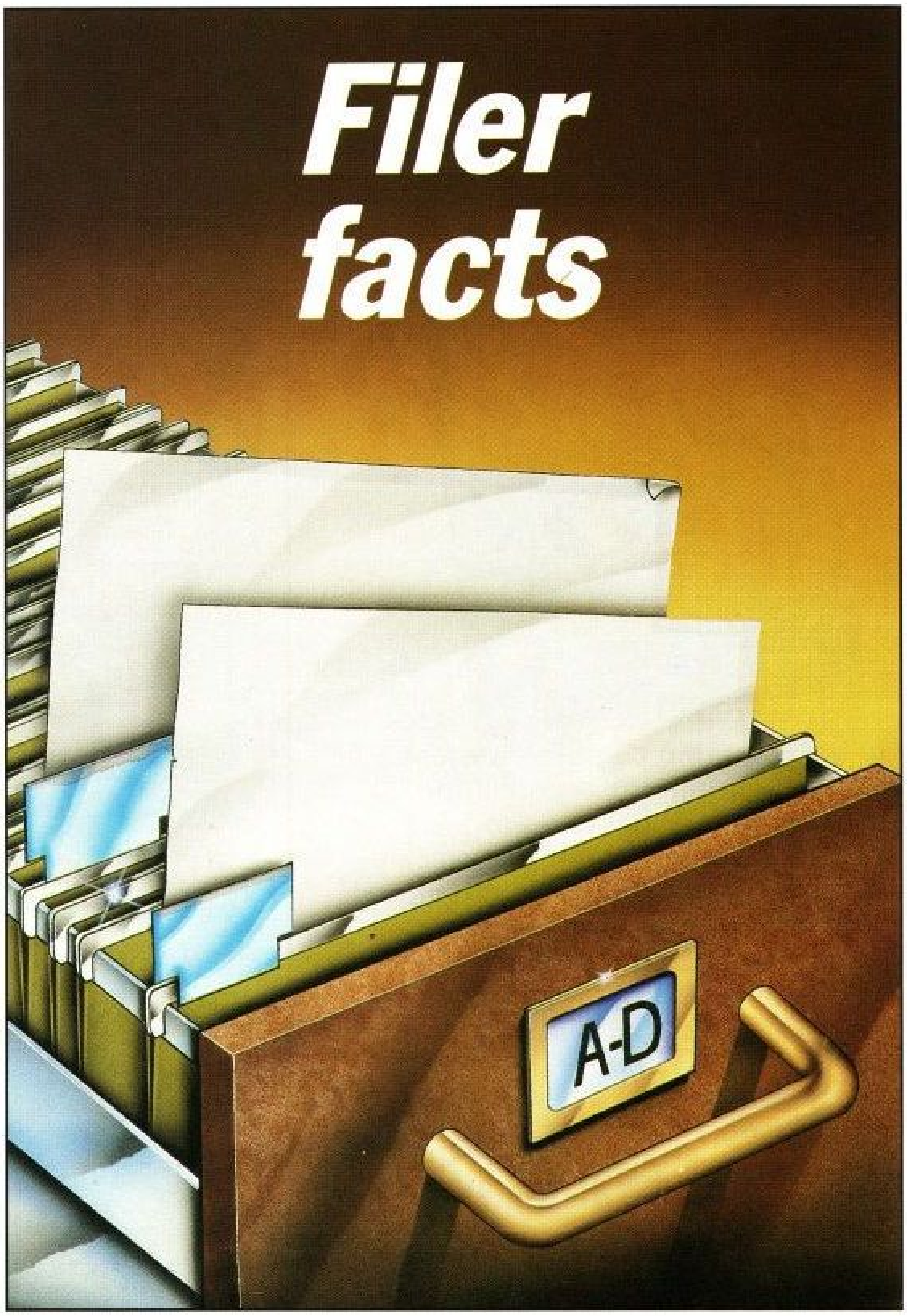
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Filer facts



Cassette recorders and disc drives can do more than save and load programs, they can also be used to expand memory by using them for data storage. Phil Lawson shows you how

DATA files contain information that is read by a program when needed. A point often raised is that if the information held in the file is only data, why not use DATA statements? The main argument for this is speed, because reading information from tape or disc takes longer than getting it directly from memory.

But what happens if the data needs to be altered, as in a database or spreadsheet? This would mean having to edit the program, making changes manually. You could read it into arrays and variables, but then it takes up twice the memory – once in the DATA statement, once in the array or variable. And when you save the program the revised data would be lost because variables are not saved with it.

So you can see that storing data in a file has distinct advantages.

Enter and run Listing I, which writes out a file called *myfile* and then reads it in again. If you are using tapes you should rewind when the routine wants to read the file back. When the program has finished you should see *Fred Bloggs* appear on the screen. What exactly is happening here?

```
10 ' Listing I
15 '
20 OPENOUT"myfile"
30 PRINT#9,"Fred Bloggs"
40 CLOSEOUT
45 '
50 OPENIN"myfile"
60 INPUT#9,dat$
70 PRINT dat$
80 CLOSEIN
90 END
```

Line 20 tells the CPC to open the file. The reason for the OUT part is because we are sending data from the computer out to the file – OPENOUT means OPEN a file for OUTput. Line 30 looks just like a normal PRINT statement, except for the #9. This prevents the characters within the quotes that follow it being displayed on the screen, instead sending them to the currently open file. In Line 40 the output file is closed.

The rest of the program will now read the data back and display it on the screen. The OPENIN command in line 50 works in the same way as OPENOUT, except that because the data will be coming into the computer the file is opened for input.

The INPUT#9 instruction in line 60 reads data from the file into the string *dat$*. It's the #9 again that makes the CPC take the information from the file instead of the keyboard.

To display the data on the screen we use a normal PRINT command, and the final CLOSEIN instruction closes the input file. This lot can be a little confusing at first, so work through Listing I until you understand what's going on. then change lines 30, 60 and 70 to:

```
30 PRINT#9,1,2,3
60 INPUT#9,a,b,c
70 PRINT a,b,c
```

Running the program again will create the same file, but this time it will contain the numbers 1, 2 and 3 instead of *Fred Bloggs*. This shows it is possible to store numbers as well as strings, and that when several items are written to a file in one PRINT statement they should be separated by commas.

We've discovered how to handle strings and

numbers, but what about both at the same time? Enter and run Listing II.

```
10 ' Listing II
15 '
20 OPENOUT"myfile"
30 name$="Harry Smith"
40 age=40
50 PRINT#9,name$,age
60 CLOSEOUT
65 '
70 OPENIN"myfile"
80 INPUT#9,n$,a
90 PRINT"Name=";n$
100 PRINT"Age=";a
110 CLOSEIN
```

Here we're creating a file about Harry Smith, who happens to be 40 years old. The bulk of the program is similar to Listing I, but it stops with the error message *EOF met in line 80*.

EOF stands for End Of File, and it means the program is trying to input more data than the file contains. Examining lines 50 and 80 shows that we have output a string and a numeric variable and then tried to input them again. To try and locate the error, let's print out the values of *n$* and *a*. Type:

```
PRINT"Name=";n$,"Age=";a
```

and press Enter. Looking at what appears on the screen, it would seem that the number 40 has been included as part of the name. The reason for this is that in the file we've created there is a line which reads:

```
Harry Smith 40
```

The gap between the name and the age is made up of spaces, so the entire line of data goes into *n$*, leaving nothing to read into *a*. What we need is a method of telling the CPC that the h at the end of Smith is the end of the string. There are several ways of doing this. Try changing line 50 to:

```
50 PRINT#9,name$:PRINT#9,age
```

This puts the name and the age on separate lines because both PRINT statements automatically insert carriage returns. The program now runs properly because INPUT#9 takes a carriage return as a marker for the end of an item.

Carriage returns aren't the only things the CPC uses as markers, it also uses commas. Change line 50 to:

```
50 WRITE#9,name$,age
```

The WRITE instruction works in a similar way to PRINT, except that it separates each item in the file with a comma and puts quotes around strings. Running the new version of Listing II will now produce the desired result.

Something to look out for is that if you are reading a string that contains commas or quotes, INPUT#9 will split it up because the punctuation is taken to indicate the end of a data item.

The way round this is to use LINE INPUT#9, which will read everything up to the carriage return. Conversely, if you use LINE INPUT#9 on a file created using WRITE#9, you will get several items at once because the commas and quotes are ignored.

The end is nigh

How do we read the entire contents of a file if its length is unknown? For instance, Listing III will create a file with a random number of items.

All we need now is a routine to read the data back again, so after saving Listing III, reset your machine and enter Listing IV.

The more observant among you will have noticed that line 30 in Listing IV is reading the data into a string, which may seem silly when Listing III created the file using numeric variables. But because numbers are saved as Ascii characters, reading them into strings is perfectly acceptable. The reverse, however, is not true. You can't read non-numeric Ascii characters into a numeric variable.

```
10 ' Listing III
15 '
20 OPENOUT"random"
30 limit=INT(RND*50)+50
40 FOR a=1 TO limit
50 WRITE#9,a
60 NEXT
70 CLOSEOUT
```

```
10 ' Listing IV
15 '
20 OPENIN"random"
30 INPUT#9,a$
40 PRINT a$;",";
50 GOTO 30
```

Running Listing IV will display the contents of the file, each item separated by a comma, and the EOF message is displayed at the end. Although this error message could be trapped with an ON ERROR GOTO instruction, it is not something we wish to happen within our programs.

Fortunately, Basic has a simple method of detecting the end of a file. Change line 50 to:

```
50 WEND
```

and add the following lines:

```
25 WHILE NOT EOF
60 CLOSEIN
```

Lines 25 and 50 make up a WHILE...WEND loop that keeps repeating until the end of file is reached. This way we can read the contents of a file without the risk of generating an error.

There is another use for #9 which concerns the command LIST. It is possible, through a combination of these, to save a selected part of a Basic program. This can normally only be done by deleting the bits you don't want and saving what's left. To use this new method, just enter:

```
OPENOUT"progname"
LIST firstline-lastline,#9
CLOSEOUT
```

where *firstline* and *lastline* are the line number you want to start and stop. For instance, the command to save everything from line 1000 to 3000 is *LIST 1000-3000,#9*. If you have a printer, try changing #9 to #8 to get a hard copy of part of a listing.

That wraps up this introduction to file handling on the CPC except for the question beginners to Basic always ask – how to save an entire array to file. Listing V shows you how it's done. I'll leave you to study it.

```
10 ' Listing V - Array saving demo
15 '
20 MODE 1:PEN 1
30 DEFINT a:DIM a(5,10)
35 '
40 ' Fill a() with random numbers
45 '
50 FOR x=1 TO 5
60 FOR y=1 TO 10
70 a(x,y)=RND*10:LOCATE x*3,y:PRINT a
   (x,y)
80 NEXT:NEXT
85 '
90 ' Write it to file
95 '
100 OPENOUT"fred"
110 FOR x=1 TO 5
120 FOR y=1 TO 10
130 WRITE#9,a(x,y)
140 NEXT:NEXT
150 CLOSEOUT
155 '
160 ' erase and re-dimension array
170 ' to prove it's not old data
175 '
180 ERASE a:DIM a(5,10)
185 '
190 ' Read information
195 '
200 PEN 2
210 OPENIN"fred"
220 FOR x=1 TO 5
230 FOR y=1 TO 10
240 INPUT#9,a(x,y):LOCATE x*3,y:PRINT
    a(x,y)
250 NEXT:NEXT
260 CLOSEIN
265 '
270 PEN 1:END
```

The land of Shades

by someone who has been there and survived

There are two styles of play in Shades: T-collectors pick up treasure, stacking up points in the hope of one day getting to the status of wizard. Killers go around killing T-collectors and each other in the hope of gaining a glorious reputation.

It is very hard to get to be a wizard if you are a killer, because you will inevitably be killed a few times yourself, losing your points. But that does not stop people! Many players have two or more characters so they can play one as a killer and one as a more peaceful sort.

Whichever you choose you must know something about fighting or you will be at the mercy of anyone.

In Shades everybody can do some damage with their bare hands. This is your POWER which you can check by typing SCORE. But this is not much use except for killing very weak creatures like the bat and the sprite.

Luckily there are weapons: If you get the axe and type POWER AXE you will see it does 20 points of damage on its own, plus your own bare hands power.

When you are attacked you can type RETALIATE WITH AXE (if you have it) and you will suddenly stand a chance of winning. RET AXE is the short form, and you must get used to employing these shortened forms or you will end up as mincemeat before you even get your spelling right.

If you want to start the fight then you type KILL GUARD or KILL NANJUSI or whoever it is you want to kill. But if you lose a fight you have started you will forfeit all your points instead of half, so be careful. Also it's a good idea to STEAL your opponent's weapon if he has one and do not forget to FLEE OUT if you are losing badly.

Whirlwind's first rule of fighting: Fleeing is more fun than being a corpse, but being a corpse is more fun than doing nothing at all. Fight back hard and the killers may give up eventually.

May the Goddess go with you!
Whirlwind

PS Hi to Goldie's Ozzzy, Rapunzel, Sharon, Ann, Plutonium and Liane's boyfriend Humber. Also boo, hiss to Comander who is cheeky to the girls: I have your name in my book so I will be killing you soon, he he!

You can enter the land of Shades using your micro, a modem – and a registration to MicroLink.
If you are not a member write for details to: MicroLink, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.

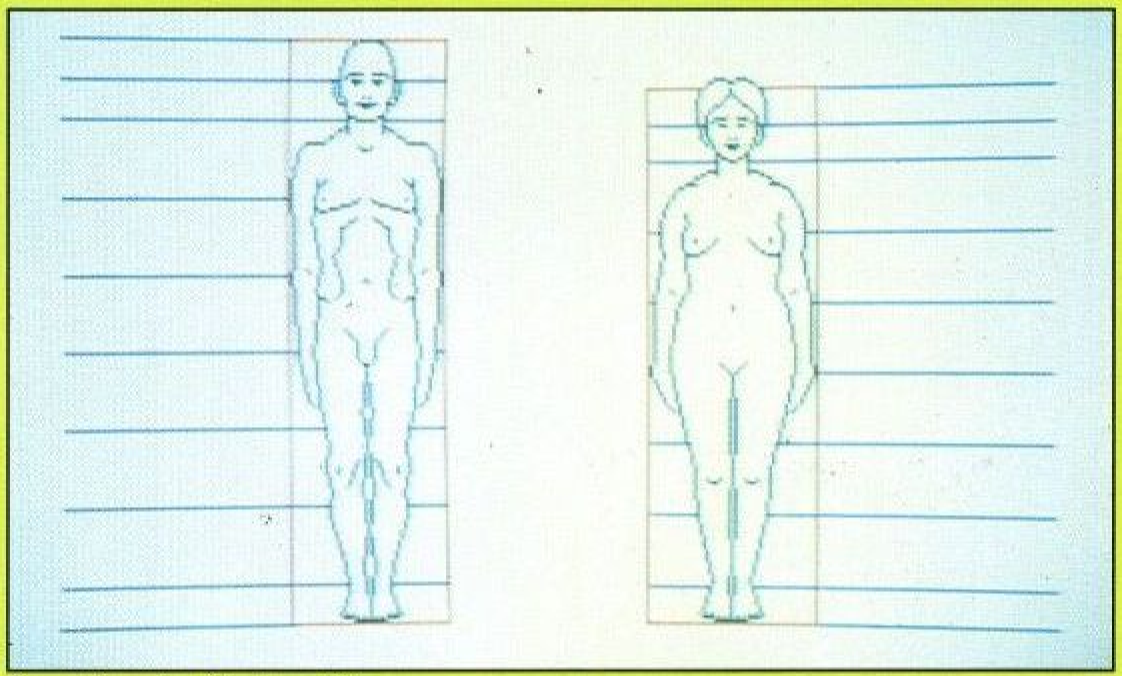


Figure I: Properties of the human body

Painting people

Jill Lawson shows you how to tackle the tricky task of sketching the human body

PORTRAYING the human figure has always been one of the artist's most difficult tasks. The body is an amazingly complex piece of machinery, and to draw it accurately, especially in action, demands a rudimentary knowledge of anatomy and a great deal of practice. In some ways the limitations of the size, resolution, and colours available on the computer screen make the job easier, since a lot of the fine detail has, of necessity, to be left out.

A young child will see the human form as a large head with matchstick arms and legs coming from it at odd angles. Over the years perception improves, and most of us could draw a recognisable representation of a figure, with the arms and legs attached to it at more or less the right places.

However, even an artist who is quite competent in other respects may find difficulty with the proportions of the human body. Frequently the figure will have an over-large head, short legs and tiny hands and feet.

Although there are great variations between different people, as a general rule, using the depth of the head as the unit of measurement, an average adult will be around seven and a half heads tall, and the average male will be approximately half a head taller than his female counterpart, although his own head-to-body ratio will stay the same, because the male head is slightly larger than the female.

Take a look at Figure I; note that the eyes are on a line through the middle of the head, and that the top of the legs is roughly half way between the eye-line and the ground. The wrist-bone to the tip of the middle finger is almost one head long, the foot rather more than one head.

The male figure is noticeably angular, with the bone structure apparent in the broad shoulder region and in the limbs. He has a wide square chest, and his pelvis is quite narrow. In contrast to the rugged shape of the male, the female form is softly rounded with sloping narrow shoulders and wide hips.

Although you will rarely want to draw anyone facing you directly and standing to attention, it is a worthwhile exercise to copy these drawings to gain a feeling of the basic shape of each figure. When you are satisfied, imagine they have turned through 90 degrees. See how you get on with a sideways view.

Look at people around you if you get stuck; instead of being oval, the head is almost square in profile. From the back of the neck the shoulders, seat, and calves curve outwards, and there are inward curves at waist and ankle. From the throat, the chest slopes forward, curving gently over the stomach to the top of the legs, down to the knees then backwards to the ankles.

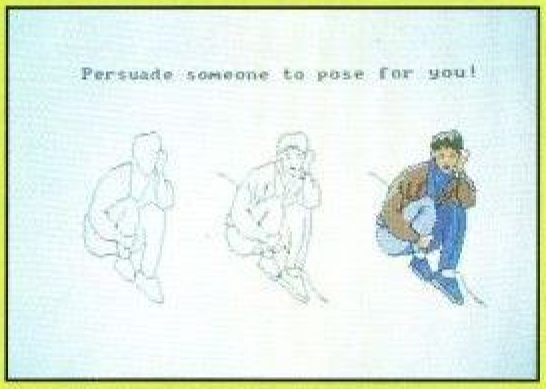


Figure III: Three stages of life drawing

In children the proportions are somewhat different. The head is larger, the body is more or less the same width all the way down, and there is little difference between males and females up to eleven or so. A child of around a year will be just under five heads high; at five this will have increased to five and a half heads, at 10 to six heads.

If you are going to put figures into your drawings it is probable that they will be doing something – running, jumping, or participating in a sport of some kind perhaps.

Try drawing a series of little matchstick men to

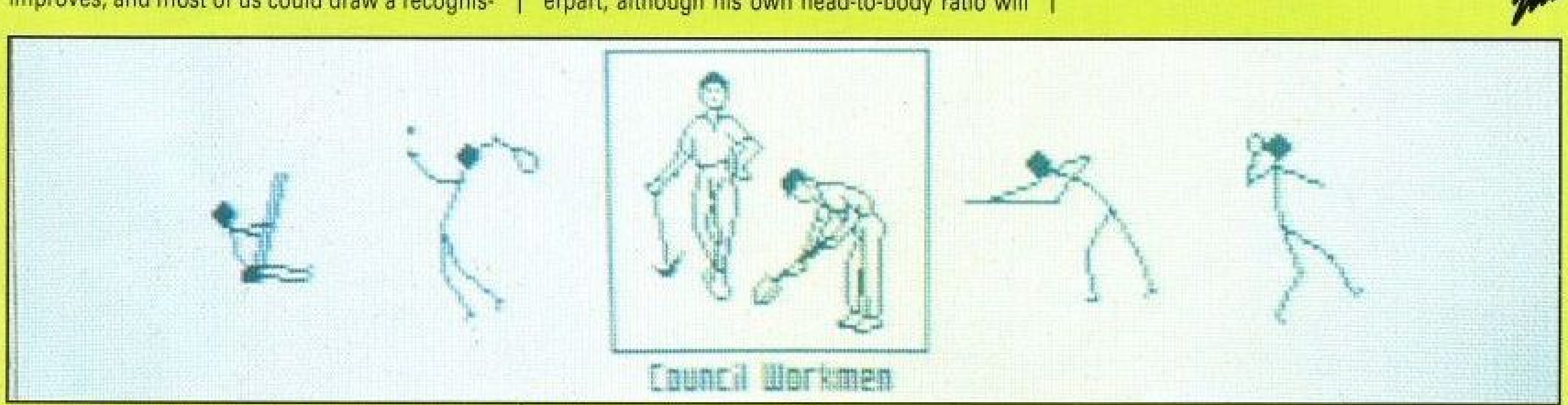


Figure II: Draw a series of matchstick men to practise positions associated with various activities

illustrate body positions associated with various activities (see Figure II). If you are satisfied with the results it is fairly simple to use them as a framework for little figures like my council workmen. For larger figures they could be drawn in a contrast colour, and re-scaled to give you a skeleton on which to build.

Drawing people from the front, back or either side is not difficult with practice, but often these aspects will not fit with the rest of your picture. Or you may just prefer a view from above, below or at an angle.

Because figures, like everything else you draw, are subject to the normal rules of perspective and foreshortening, it is sometimes very difficult to imagine just how they will appear to the viewer. If you can persuade someone to adopt the appropriate position for a short while it will give you a chance to sketch in the principle outlines. You can see the idea in Figure III. Extra detail and colour can be added at a later stage.

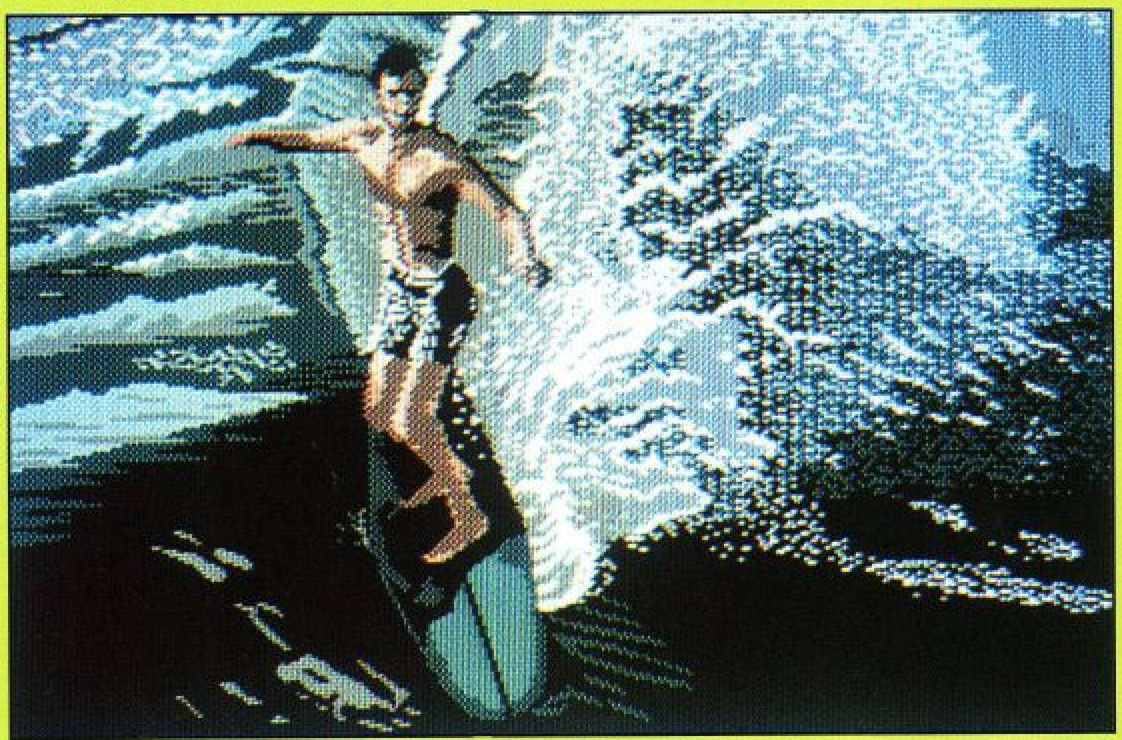


Figure V: Use stronger tones with white highlights to suggest glistening flesh

Colour and shading

If your figures are going to be part of a Mode 1 picture drawn in the usual choice of black, white and two other colours, you may well have to settle for the areas of exposed flesh – face, hands and possibly arms and legs – being left white.

This will work quite satisfactorily as long as the outlines are clear and the figures are fairly small. Where they constitute the main subject matter of the picture there are up to four colours which



Figure IV: Different colouring styles

may be used for flesh tones. These are pink, orange, white and dark red.

Often it may be possible to use the dark red as a substitute for black in other parts of the picture to leave yourself a greater range of colours. Neither the pink, the orange, nor their attendant mixtures with the white and dark red produce particularly convincing flesh tones, so it will be a matter of personal choice which one you use.

Remember that the human body is a three-dimensional object made up chiefly of what amounts to cylinders. Where the size allows, some shading will help to stop them looking like cardboard cut-outs.

It is possible you may get away with a dark outline and single solid fill, as with the toddler on the left in Figure IV, but the treatment of the baby on the right would normally be more satisfactory.

With an athlete in action, try using stronger tones with white highlights to suggest glistening flesh, and look for shadows delineating leg muscles as in Figure V.

Although everybody's face is made up from the same basic features, these are arranged with so many subtle variations that it would seem almost impossible to go wrong. Any rules therefore are only a guideline to the most likely position of the eyes, ears, nose and mouth.

The head and ears viewed from the front without hair will usually fit into an ellipse two-thirds as wide as it is high. The eyes, and the top of the ears lie on a line which horizontally bisects this ellipse (see Figure I).

If the lower half of the face is divided again, all of the mouth will lie below this line, and its width will be approximately equivalent to half the distance between the outer corners of the eyes. The upper lip will be strongly defined, the lower one less well so. The female face, like her body, is rounded, oval or heart-shaped, while the male jawline is angular and his whole face has a more square appearance.

If you wish to draw a particular person you may be able to capture a picture with a digitiser, though you will almost certainly have to do some tidying and re-drawing. Otherwise, it is essential to obtain a good, clear photograph of the person concerned. It is useful to photocopy the original picture, as this gives you a guide to where the lines and shadows that make up the likeness occur, and is also handy if you want to transfer the image to the screen via the grid method.

Helpful hints

You will find plenty of pictures of people all around you in magazines, catalogues and the sports pages of newspapers. Start a reference file of photographs that show outlines and shadows clearly, and shots of people in action or in unusual positions.

Toy shops and market stalls are a rich source of useful material. Those small plastic models of soldiers, knights in armour, cowboys and indians with figures in a wide variety of action poses are well worth collecting. I found some rather nice 5in high Sumo wrestlers – at only 50p each – which I used as a basis for a drawing. I made a rough sketch of the main outlines on paper first, traced it on to acetate and then transferred it to the screen.

When you are going to have one figure partly obscuring a second, it is a good idea – provided that your art package has a cut, clear and paste facility – to draw the two figures quite separately (see Figure VI) then move one in front of the other. Although it involves some extra work, it does ensure that the parts of the background figure that are still visible are in the correct positions.

In this article I have concentrated mainly on the the actual figure and not the clothing. Observation will show you that material creases on the inner side of a joint and pulls tight round the outside of a joint following the body contour. It will drag diagonally if the body is twisted. Shirts or trousers cling tightly to upper arms and hips. Stiff clothing stands away from the body while softer fabrics cling and drape in soft folds.

Finally, remember that attention to creases, shadows and highlights on the clothing do much to suggest that there is a solid frame underneath.

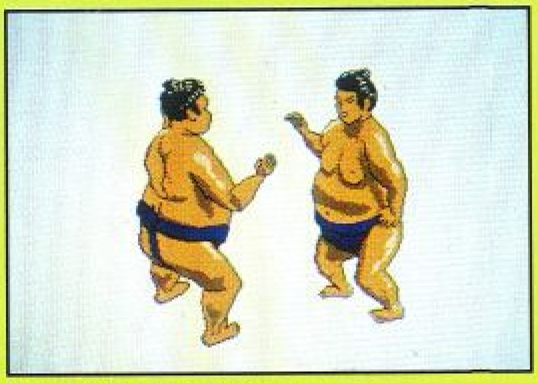
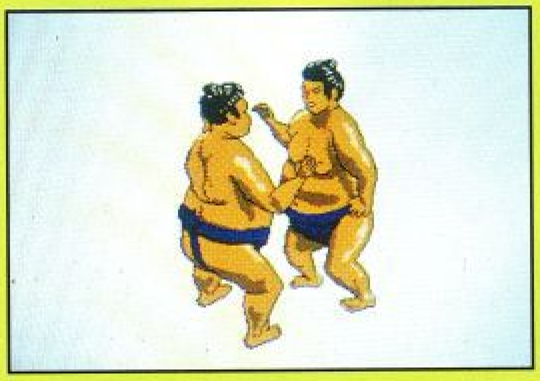


Figure VI: First draw the figures



...and then move one in front of the other

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Mode 3 is a two-screen, four colour, Mode 0 that lets you have data on the background screen which you can't see, but which is nevertheless there. Very fast animation can be created by flipping instantly from the foreground to the background screen. *January 1986.*

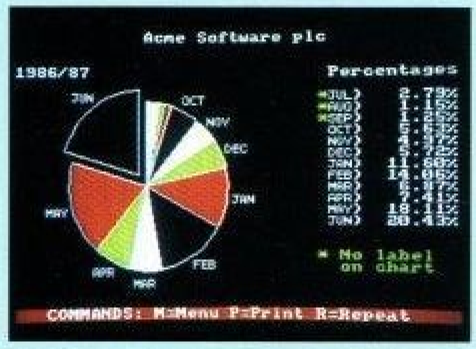
ANIMATOR*
Animator is a wire frame drawing suite of programs that allows you to put together a number of key frames, and the software will 'tween' them to produce a finished cartoon. *April 1986.*

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JET SET WILLY HACK*
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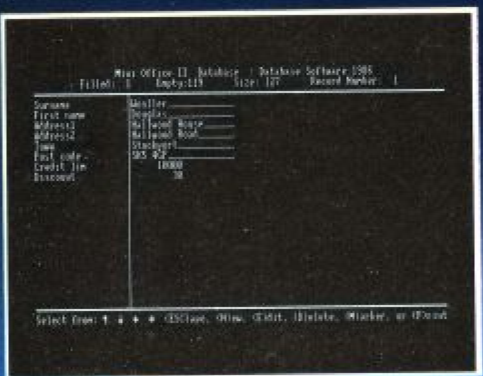
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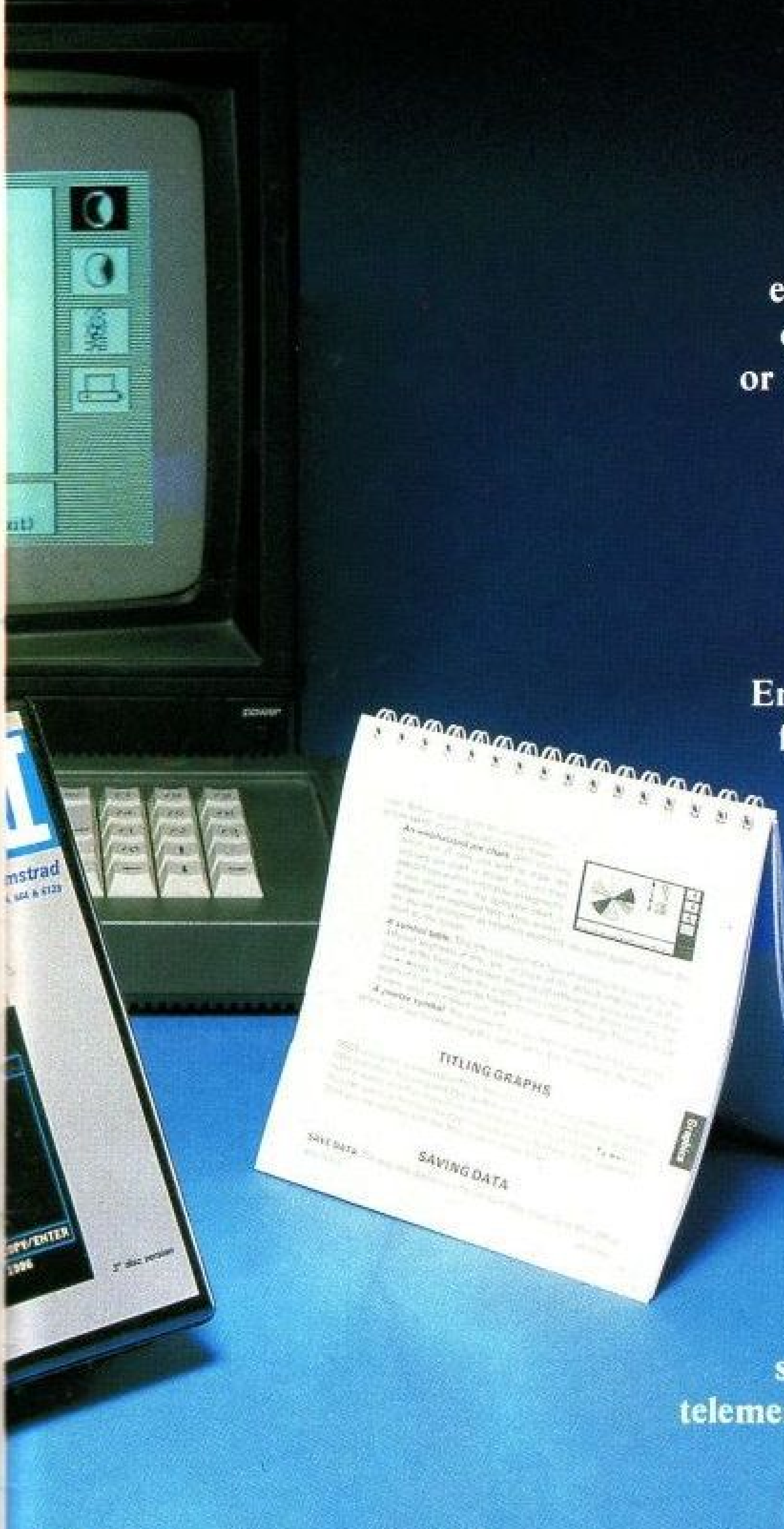
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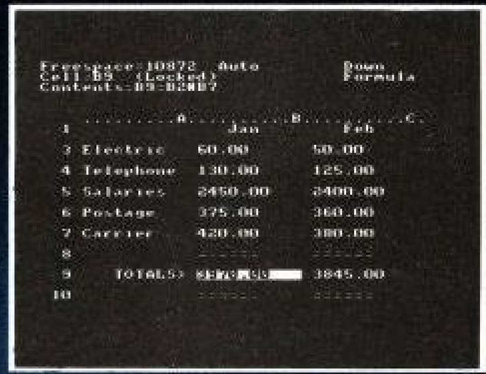
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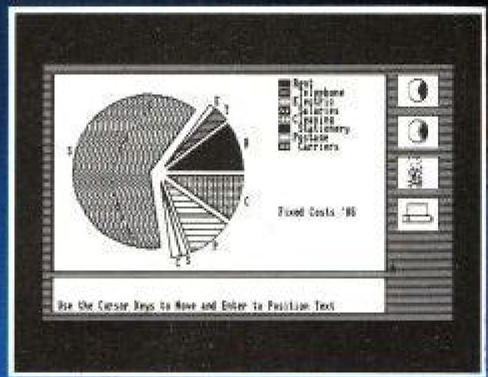
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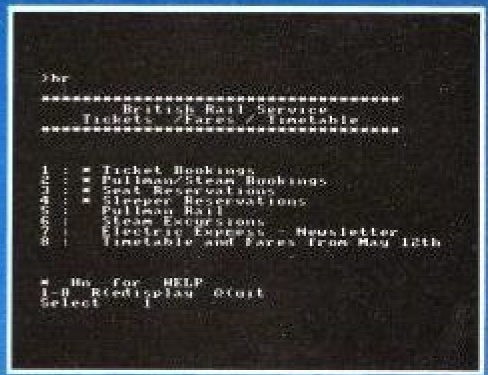
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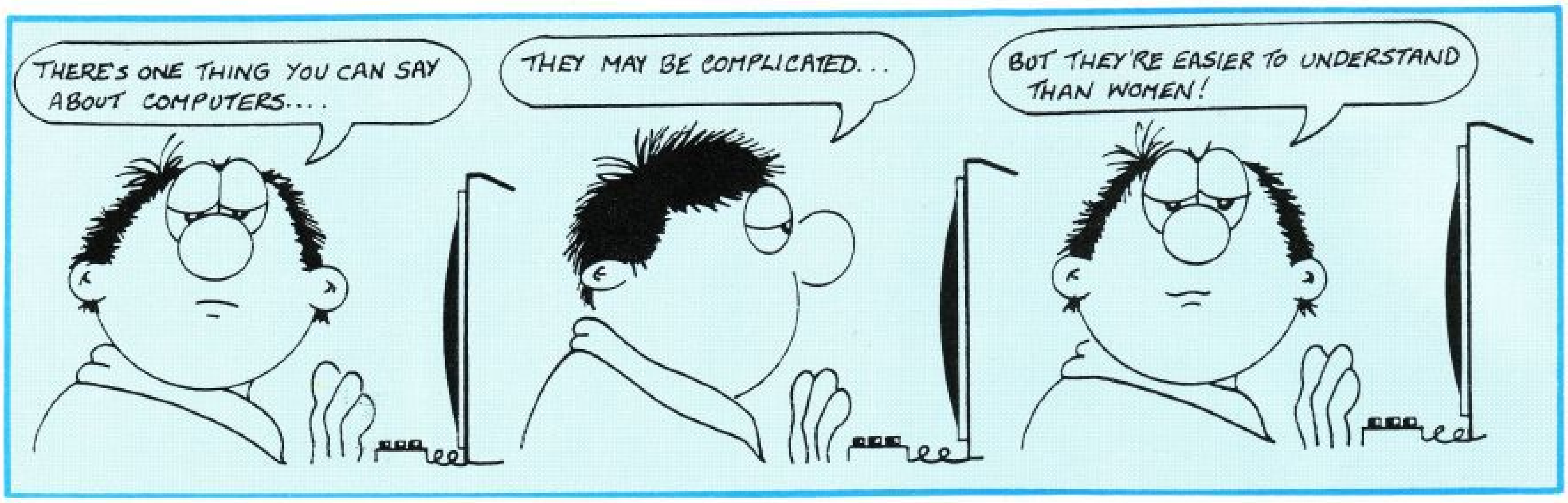
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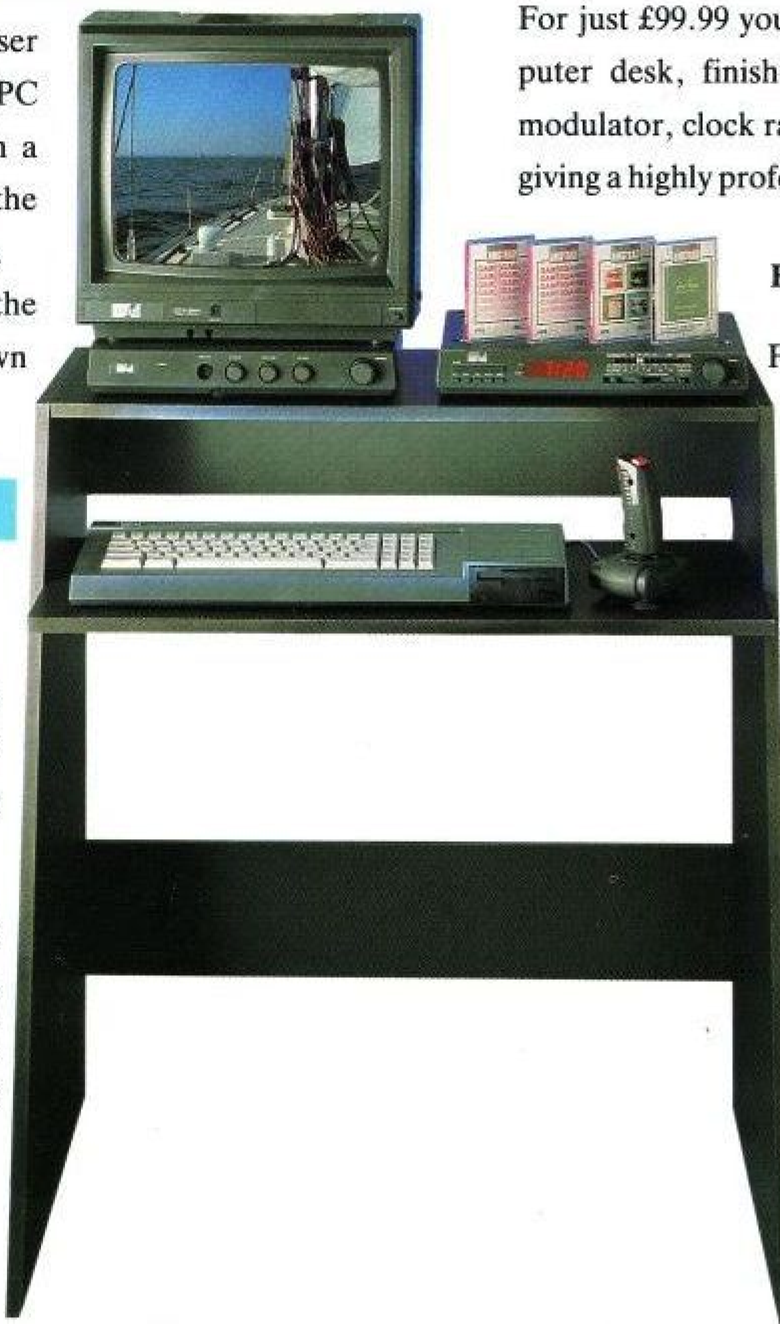
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